Installation Manual

IM 168-7

HiLine™ Vertical Stacking Fan Coil Unit

Group: Fan Coil

Part Number: 667753900

Date: January 2013

Models FHSS 110 and FHSS 112



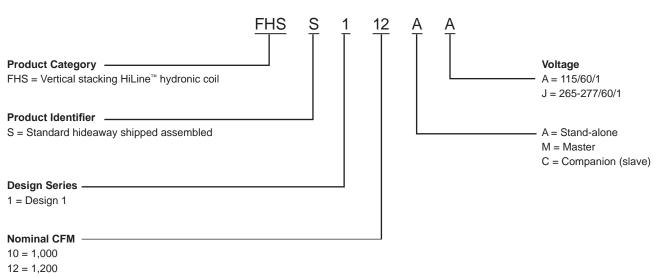


Table of Contents

General Information	Appendix20
Installation4	IM 1014
Wiring Diagrams10	MT 155 Thermostat
Start-Up12	IM 1019
Maintenance	MT 180 Programmable Thermostat
Service14	IM 1015
	MTA 158 Microprocessor Thermostat On/Off Controller
	IM 1016-1
	MTB 158 Microprocessor Thermostat On/Off and 3-Wire Controller
	IM 1017
	MT 168 0-10 VDC/4-20mA Thermostat 48
	IM 846
	T170 Thermostat 51

IM 831

Nomenclature



Daikin HiLine fan coil air conditioning units are designed for use in multiple floor apartments and office buildings, hotels, and other similar applications. They require a minimum amount of floor space and one unit may serve several rooms, thus reducing installation costs.

The 1000 and 1200 cfm draw-through configuration units described in this manual are designed for multiple discharge arrangements so that one unit can serve more than one room. Two-pipe and four-pipe systems are available, with single, double, triple, and top discharge arrangements. Optional equipment is available to provide complete application flexibility.

Installation and maintenance must follow accepted industry practices as described in the ASHRAE Handbook, the National Electric Code, and other applicable standards. Install this equipment in accordance with regulations of authorities having jurisdiction and with all applicable codes.

Installation and maintenance must be performed by qualified personnel familiar with applicable codes and regulations and experienced with this type of equipment.

⚠ CAUTION

SHARP EDGES ON SHEET METAL AND COIL SURFACES if not avoided could result in cuts.

Receiving and Handling

Carefully check items against the bills of lading to verify all crates and cartons have been received. The units normally ship four to a pallet.

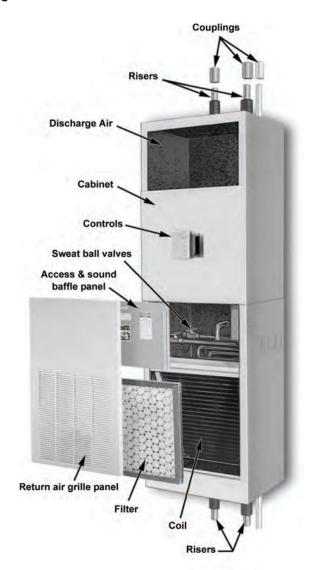
Carefully inspect all units for shipping damage. Report damage immediately to the carrier and file a claim.

Check the electrical nameplate to be sure it agrees with the power supply available.

DO NOT handle units by the riser piping. Riser clamps hold the riser in position; they are not designed to support the cabinet weight. They are removed after the unit is installed.

Units are completely factory assembled and wired and have individual thermostat controls. They are installed by stacking one unit on top of the other. While installing, prevent dirt and other foreign matter from entering the risers and plugging lines or valves.

Figure 1: HiLine fan coil unit



Installation

Cabinet

- 1. Lift and position unit in place directly above the unit on the floor below. See Figure 2a.
- 2. Align riser extensions with risers on unit below.
- 3. If field-supplied isolator pads are used, install them now before connecting risers.
- 4. Before anchoring the risers in place, center the horizontal stubs protruding into the cabinet in the 3" (75 mm) slots in the panel risers. This allows for riser expansion or contraction of plus or minus one inch. Risers extend 5" (127 mm) above the cabinet when the stub is centered in the slot.
- 5. Anchor risers to the building structure to prevent vertical riser movement greater than ±1" (25mm) due to riser expansion or contraction.

⚠ CAUTION

The unit is not designed to support the weight of the risers. Anchor them securely to the building structure.

- 6. With the unit in position, check that it is level to provide proper condensate drainage and operation.
- 7. Connect supply and return risers to unit on floor below (Figure 2c) by soldering slip couplings (reducing couplings, if required, are not supplied by Daikin).
- 8. Join drain riser with coupling using PVC solvent cement on both surfaces (or solder if riser is copper).
- Apply insulation to risers and to cement joints between units to avoid condensation problems. (Not provided by Daikin).
- 10. After the unit is installed, remove the riser ties.
- 11. Restore the fire resistance rating of the structure to comply with existing building codes, by sealing the access space around the risers with material having the same fire rating as the structure. Also provide a seal between floors to prevent the passage of warm, humid air, which can cause condensation on riser insulation. This is most critical in unpressurized buildings with high infiltration rates.
- 12. Vent the coils. The vent is accessible from the return air opening.
- 13. Before furring in unit, hydrostatically test the riser and unit connection joints to make sure they are leakproof.

Figure 2: Installation overview

2a. Placing unit above unit on the floor below.

2b. Unit already in place, ready to accept the unit above.

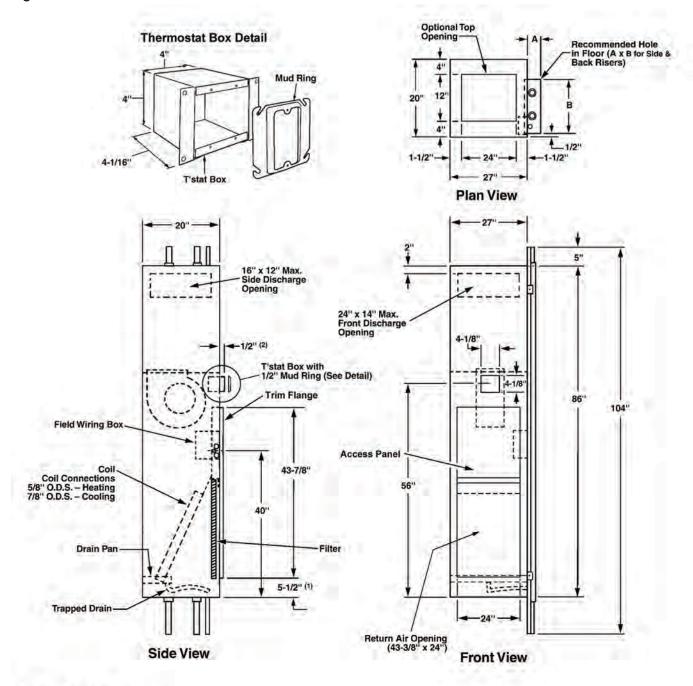
2c. Making connections.

2d. Unit "furred in" with grille attached and thermostat wired.

2e. Completely installed unit.



Figure 3: Dimensional detail



Right Hand Unit Shown

Hand of unit determined by facing return air opening.

Risers on right = Right hand unit.

Risers on left = Left hand unit.

Risers on back = Neutral unit.

Note - (1) With return air grille mounted on unit, dimension becomes 4-3/4".

(2) Can be field adjusted to 3-7/8" for furred-in application.

Furring In

- When furring in units, make sure no screws or nails penetrate the unit cabinet, other than grille or plaster frame attaching screws. Grille or plaster frame attaching screws should not penetrate the cabinet more than 2" (51 mm).
- 2. The thermostat box can be positioned up to 3-7/8" (98 mm) from the unit for furring in. The mud ring can be positioned vertically or horizontally and has 2" x 4" opening. (see Figure 3).
- 3. If the wall board or other wall material does not fit flat against the face of the unit, install field-supplied extension sleeves for both the return and supply air openings.

Wiring

The complete unit system wiring diagram is located on the front of the access panel. Wire in accordance with local codes or the National Electrical Code, whichever is applicable.

- Provide branch circuit overcurrent protection and disconnect means.
- 2. Bring electrical wiring through the side of the cabinet into the wiring box located on the right side of the cabinet (see Figure 3 Side View) using the two 7/8" (22 mm) diameter knockouts.

NOTE: When routing wiring through the cabinet, make sure the fan remains accessible for possible removal.

3. Connect control wiring to the unit-mounted thermostat and fan switch or a remote mounted control.

NOTE: A remote mounted 10 K thermistor is mounted on all units for sensing return air temperatures. The 10 K sensor is also provided with all factory purchased thermostats.

4. Rotate the fan wheel by hand to make sure it rotates freely.

Ducts

If ducts are added:

- Install in accordance with NFPA 90A and 90B.
- Check that the resistance is within the limits of the external static pressures shown in the catalog for the particular unit being installed.
- Design the ducts for velocities in accordance with the methods outlined in the ASHRAE guidebooks.
- Control airborne noise by installing sound attenuating materials and by installing flexible connections between the unit and ductwork.

Finishing

1. Attach the return air grille plaster frame on the opening over the top of the wall board. Use the wall board frame as a template to drill pilot holes into the wall or unit for the attaching screws (see Figure 4).

NOTE: Mount the plaster frame with the corners square so that the grille panel will fit over it properly.

2. Attach the supplied retaining clips to the plaster frame adjacent to the lower attaching screws (see Figure 5).

Figure 4: Grille panel with plaster frame

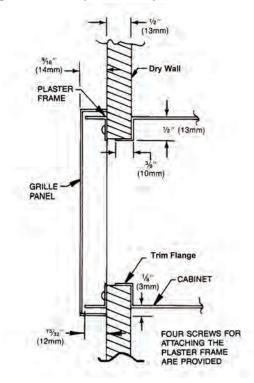
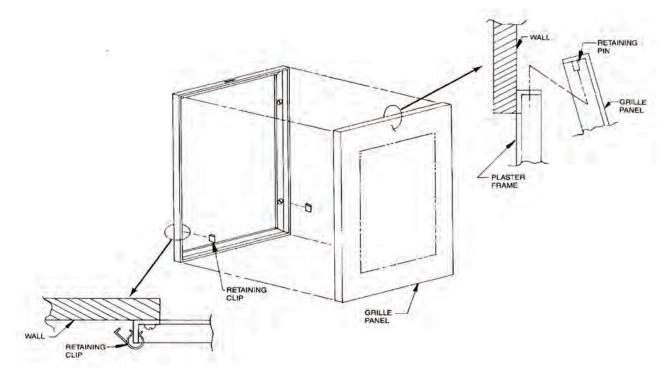


Figure 5: Plaster frame retaining clip installation

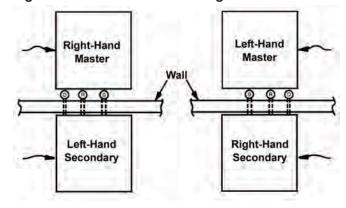


Twin Units Installation

Twin opposite hand units share a common riser system; i.e., supply, return, and drain riser. This is commonly called a "master/slave" arrangement. The master unit is shipped with the risers attached. These special risers have stub-outs which must be field connected to the slave units. In addition to the instructions in bulletins IM 254 (FHSK units) or IM 255 (FHSS units), the following procedures must be followed for alltwin unit installations.

- 1. The slave unit has no risers and no stub-outs. Knockout holes are provided for internal piping connections.
- 2. FHSS-110 and -112 units will not match up with the smaller units sizes 03, 04, 06 and 08 due to differences in riser stub-out locations.
- Master units are offered in two-pipe or four-pipe systems with either right-hand or left-hand connections.
 Secondary units are offered to accommodate internal connections to any of these riser systems or locations.
- 4. The riser location (right or left) is determined by facing the return air grille panel. The risers are located on either the right or left of the unit. This defines the riser location and unit handing. See Figure 6.

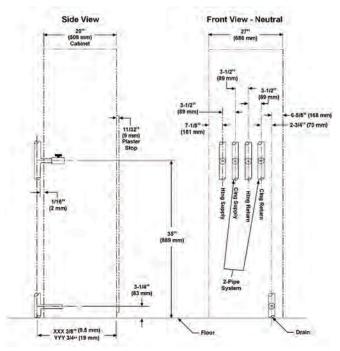
Figure 6: HiLine Twin Unit Arrangements



- 5. The riser block-off plates are located in the base of the slave unit. Block-offs must be installed on the slave unit before putting it into position. (see Figure 8 on page 9).
- 6. Install the master unit per IM 254 or IM 255.
- 7. Recommended wall opening locations for the slave unit risers and stub-outs are shown in Figure 7 on page 8

Installation

Figure 7: Riser and stub-outs locations



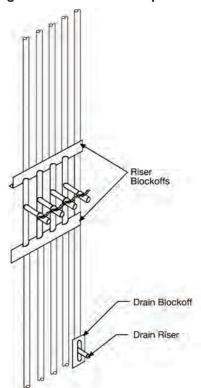
- 8. The openings must provide enough space to allow easy installation of the unit. During installation, the unit is tilted at an angle to set into place. Unless the opening in the wall is large enough, there will be interference and the unit cannot be set into position.
- 9. Openings must be large enough to accommodate riser stubs with foam insulation. An allowance must be made for insulation thickness, fitting connections, and hand valves on the stub-outs.
- 10. The opening in the wall must provide space for vertical movement of riser stubs as a result of riser expansion and contraction.
- 11. The slave unit piping terminates with 5/8" sweat connections. The piping is also supported inside the cabinet to prevent any damage to them during shipment. This support bracket must be removed to allow expansion or contraction in the piping after unit is installed.

- 12. The ball valves are not factory mounted to the slave unit piping because there would be insufficient room between ball valve and cabinet to make field connections to the unit. The ball valves (quantity 2 on two-pipe, 4 on four-pipe), if ordered from Daikin, will be shipped in a separate box. The correct installation procedure, as outlined in subsequent paragraphs, is to first mount the ball valves to the riser stub-outs and then set the slave unit in place with the ball valves protruding through the slave unit riser knockouts. The connections can then be made between ball valves and unit piping within the HiLine slave unit.
- 13. The length of tubing between the 5/8" O.D. slave unit stub-out and the hand valve for the slave unit is to be provided by the contractor. The length will be determined by the dimension between the walls.
 - After the master unit is set in place, the field supplied tubing should be sweated to the riser stub-outs and ball valves sweated to the field supplied tubing. Hand valves should be closed and risers pressurized to locate any leaks. Leaks should be repaired before slave units are installed and access is restricted.
- 14. Stub-outs from the supply and return risers are 35" (889 mm) on center from the bottom of the unit. They are to be made of 7/8" copper tubing for the supply and return cooling, and 5/8" for the supply and return heating. The standard stub-out length is 2-3/4" (70 mm) beyond the outside diameter of the riser.
- 15. The drain stub-out is either 1/2" PVC or 5/8" O.D. copper, depending on which was ordered for the job.

Installation

- 16. Secondary unit stub-outs should be well insulated by the contractor to prevent condensation problems.
- 17. Remove the appropriate riser and drain knockouts in the lower cabinet of the slave unit.
- 18. Slit the fiberglass insulation so that the riser ball valves can be pushed through and into the slave unit.
- 19. Install the slave unit riser block-off plates as shown in Figure 8.

Figure 8: Riser block-off plates



- 20. Position the slave unit to the hand valves. The horizontal stub-outs should be centered in the opening in the cabinet.
- 21. Solder connections if sweat valves have been supplied.
- 22. Attach plastic drain hose to the drain line. Be sure hose clamp is properly installed and that there are no kinks in the hose.
- 23. With unit in final location, check level to provide proper condensate drainage and operation.
- 24. Use IM 254 or IM 255 to complete the installation of the slave unit.
- 25. Figure 6 shows a typical example of a master/slave arrangement for a two-pipe system. For four-pipe master/slave riser location, refer to catalog CAT 770-5 (page 15).

Figure 9: 2-Pipe (041538651)

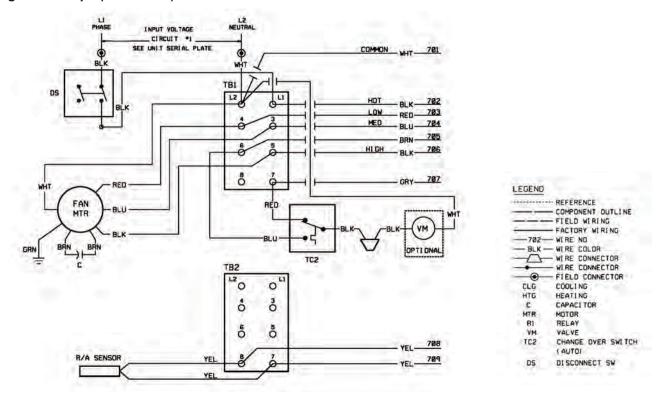


Figure 10: 4-Pipe (041538652)

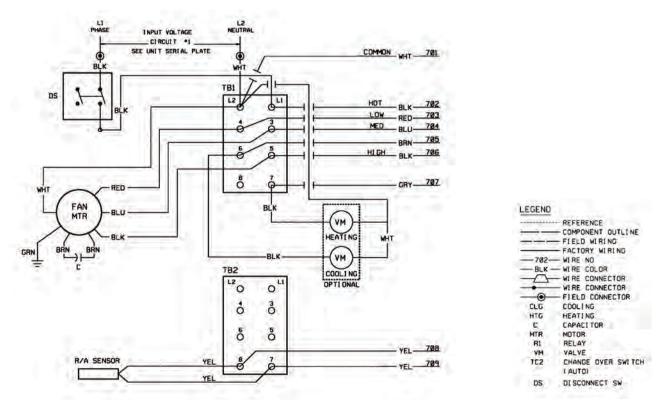


Figure 11: 2-Pipe with 1 circuit electric heat (041538653)

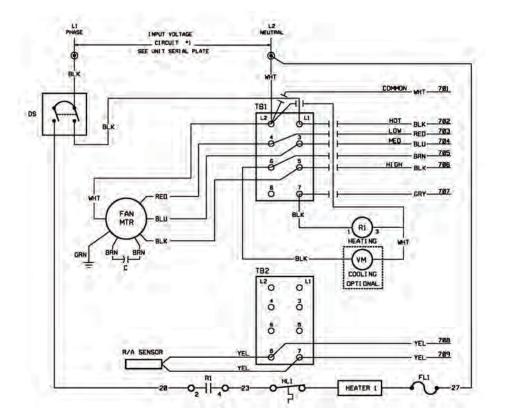
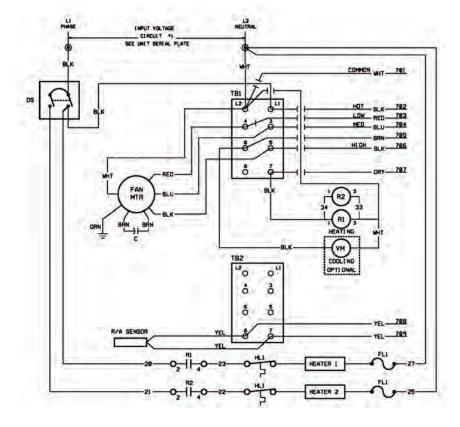




Figure 12: 4-Pipe with 2 circuit electric heat (041538654)





⚠ CAUTION

Prior to unit start-up, make sure no foreign material remains in the unit, paying particular attention to the drain pan and drain line. Blocked drains can result in drain pan water overflow.

- 1. Remove all foreign material from unit.
- 2. Open supply and return water service valves.
- 3. If the unit does not have the automatic flow control option, balance the water flow rate with the hand valve on the return line.
- 4. Install the front access panel.
- 5. Put the filter into position.
- 6. Install the return air grille.
- 7. Close all windows and doors.
- 8. Switch the unit to ON and check for proper operation of fans, fan speed switch, and thermostat.

NOTE: When there is a high amount of moisture in the air, this initial pull down should be gradual to reduce the possibility of unit sweating (i.e., high fan speed for maximum air flow with reduced GPM and elevated chilled water temperature for reduced capacity). Do not operate outside air supplies or toilet exhaust systems until the gradual pull down is complete.

Filters

- Clean filters to obtain maximum unit performance.
- Inspect filters every three or four months under normal operating conditions and replace when necessary.
- Do NOT operate units without a filter.

Drain Pans

- In areas where airborne bacteria or other microorganisms are known to produce growth in the drain pan, treat the water chemically to minimize the problem. Contact your local Daikin representative or one of the many companies dealing with water conditioning.
- The condensate drain pan can pick up lint and dirt, especially with dirty filters. Inspect the drain pan twice a year to avoid the possibility of overflow.

Fan Motor

NOTE: The fan motor is oiled at the factory. Under continuous operation; it is not necessary to oil it in the first six months.

 Oil the fan motor every six months with one teaspoon or 5 cc per bearing of SAE No. 20 nondetergent oil.
 Do NOT overlubricate.

Coil

- The coil must be clean to obtain maximum performance.
- Check the coil once a year, under normal operating conditions. If it is dirty, brush or vacuum clean. Take care not to damage the aluminum fins while cleaning.

A CAUTION

SHARP EDGES ON SHEET METAL AND COIL SURFACES if not avoided could result in cuts.

⚠ WARNING

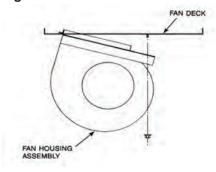
Before removing or replacing any component, lock out and tag out all power to the unit. Live electrical components, fans and belts can cause severe personal injury or death.

Fan and Motor Removal - Unit Sizes 10 & 12

If fan or motor service is required, remove the fan motor through the return air opening as follows:

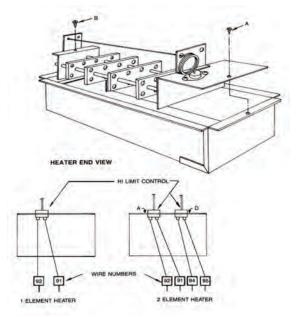
- 1. Shut off electrical power to the unit.
- 2. Remove the return air grille panel.
- 3. Remove the front access panel.
- 4. Disconnect the fan motor leads at the wiring box.
- 5. Remove the two nuts holding the side fan housing support angles to the fan deck.
- 6. Lower the front side of the fan housing, allowing the back fan housing support angle to unhook from the fan deck (Figure 13).

Figure 13: Sizes 10 and 12 fan housing assembly



- 7. Remove the fan housing through the return air opening.
- 8. Loosen the shaft setscrew.
- 9. Remove the three screws holding the motor mount assembly to the fan housing.
- 10. Remove the motor and mount assembly from the fan housing.
- 11. Disassemble the motor from the motor mount assembly.
- 12. To reassemble, reverse the above steps.

Figure 14: Replacing high limit control or heater detail



Electric Heater Troubleshooting

Daikin electric heater elements, if furnished, are designed with a high limit control set to trip when cabinet temperatures reach 175°F and automatically reset when cabinet temperatures drop to 140°F.

If the high limit temperature is tripping, the unit is not performing properly. Some probable causes are

- Not enough air over the heater due to dirty filter
- Fan motor not operating
- · Dirty coil
- Fan wheel loose on the motor shaft
- · Loose electrical connections

Electric Heater Removal

If the electric heater requires service, remove it as follows:

- 1. Shut off electrical power to the unit.
- 2. Remove the discharge grille.
- 3. Reach through the opening and remove sheet metal screws **A** and **B** as shown in Figure 14.
- 4. Lift the entire element out of the sheet metal frame as shown in Figure 14.
- 5. Replace the defective part and reinstall the heater.

When requesting service or replacement parts, direct your inquiries to Daikin Service. Refer to the model number and the serial number of the heater stamped on the serial plate attached to the heater kit. If replacement parts are required, provide the date of the heater kit installation and the date of the failure. Also, describe the part being replaced and explain its malfunction.

Table 1: Model Number Description: Fields 1—20

Field	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Code	FHS	S	1	10	Α	Α	Α	G	М	Υ	N	W	3	14	В	YY	00	YY	Υ	YY

- 1. Unit Type
 - FHS = fan coil vertical stack hydronic coil
- 2. Product Identifier
 - S = standard hideaway
- 3. Design Series
 - 1 = Design 1
- 4. Unit Size Nominal Capacity
 - 10 = 1000 cfm
 - 12 = 1200 cfm
- 5. Unit Arrangement
 - A = standalone
 - M = master
 - C = companion ("slave")
- 6. Volts/Hertz/Phase
 - A = 115/60/1
 - J = 265-277/60/1
- 7. Coil Fin Type
 - A = aluminum
- 8. Coil Casing Material
 - G = galvanized
- 9. Coil Air Vent
 - M = manual
 - A = auto
- 10. Coil Coating
 - Y = none

- 11. Coil Handing (from Return)
 - L = left
 - N = neutral (rear)
 - R = right
- 12. Primary Coil Type
 - C = chilled water only
 - W = CW/HW 2-pipe
- 13. Primary Coil Rows
 - 3 = 3 row
- 14. Primary Coil Fins Per Inch
 - 14 = 14 fins per inch
- 15. Primary Coil Valve Piping Package
 - B = basic package (control and shutoff valves)
 - D = factory-installed deluxe package (control and shutoff valves, strainer and manual flow setter)
 - Y = none
- 16. Preheat Coil Type
 - YY = none
- 17. Preheat Coil Fins Per Inch
 - 00 = none
- 18. Future Use
 - YY = none
- 19. Preheat Coil Piping Package
 - Y = none
- 20. Not Currently Used
 - YY = none

Table 2: Model Number Description: Fields 21-41

Field	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
Code	W1	14	В	R	Υ	Н	Т	000	YY	S	PSC	S	3	Υ	YY	YYY	D	Υ	YY	Υ	Υ

- 21. Reheat Coil Type
 - W1 = water standard capacity
 - ES = single stage electric heat
 - MS = single stage intermediate electric heat
 - YY = none
- 22. Reheat Coil Fins Per Inch
 - 14 = 14 fins per inch
- 23. Reheat Coil Piping Package
 - B = factory installed basic valve package
 - D = factory installed deluxe valve package
 - Y = none
- 24. Piping Orientation (Master/Standalone)
 - L = left hand hard pipe
 - N = neutral (rear) hard pipe
 - R = right hand hard pipe
 - U = universal flexible connection
 - Y = none
- 25. Piping Orientation (Slave)
 - L = left hand hard pipe
 - N = neutral (rear) hard pipe
 - R = right hand hard pipe
 - U = universal flexible connection
 - Y = none
- 26. Connection Type
 - S = stainless steel 24" flexhose
 - H = hard pipe, no union
 - Y = none
- 27. Electric Heat Power Supply
 - A = 115-60-1
 - J = 277 265/60/1
 - Y = None
- 28. Electric Heat Wattage
 - 010 = 1.0 kW electric heat
 - 020 = 2.0 kW electric heat
 - 030 = 3.0 kW electric heat
 - 040 = 4.0 kW electric heat
 - 050 = 5.0 kW electric heat
 - 060 = 6.0 kW electric heat
 - 080 = 8.0 kW electric heat
 - 000 = None

- 29. Not currently used
 - YY = none
- 30. Drain Pan Material
 - G = galvanized
 - S = stainless steel
- 31. Blower Motor Type
 - PSC = PSC motor
 - ECM = special ECM motor
- 32. Discharge Conditions
 - S = standard static
 - H = high static
- 33. Motor Speed
 - 3 = 3 speed
- 34. Motor Connections
 - Y = terminal strip
- 35. Not currently used
 - YY = none
- 36. Not currently used
 - YYY = none
- 37. Unit Disconnect Strip
 - D = disconnect strip (toggle disconnect strip)
- 38. Not currently used
 - Y = none
- 39. Control Interface Type
 - ST = panel mounted line voltage
 - YY = none
- 40. Network Communication Card
 - Y = none
- 41. Changeover Type (Controller)
 - A = auto
 - Y = none

Table 3: Model Number Description: Fields 42-56

Field	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56
Code	Υ	Υ	RF	YYY	Υ		2ECU	YYYY	2ECU	Υ	Υ	Υ	Υ	Υ	Υ

- 42. Control Box Mounting
 - F = fixed (screwed on casing)
 - Y = none
- 43. Programmability
 - Y = none
- 44. Setpoint Adjustment
 - YY = none
 - RF = remote-mounted, full range
- 45. Fan Speed Control
 - YYY = none
- 46. Timed Override
 - Y = none
- 47. Valve Primary Coil
 - See Figure 15
- 48. Valve Preheat Coil
 - YYY = none
- 49. Valve Reheat Coil
 - See Figure 15
- 50. Factory Installed Risers
 - Y = none
 - L = shipped loose for field installation
 - R = factory installed
 - X = special

- 51. Low Temperature Protection
 - Y = none
- 52. Condensate Overflow Protection
 - L = float switch (loose)
 - Y = none
 - X = special
- 53. Discharge Air Thermistor
 - Y = none
 - X = special
- 54. Smoke Input Sensor
 - Y = none
 - X = special
- 55. Occ / Vacant Control Input
 - Y = none
 - X = special
- 56. Filter Status Sensor
 - Y = none

Table 4: Model Number Description: Fields 57—72

Field	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
Code	Υ	Υ	Υ	YY	YY	Υ	F	Υ	86	SSY	SSY	YY	Υ	1	YYY	3

- 57. Fan Status Sensor
 - Y = none
 - X = special
- 58. Future Control Function
 - Y = none
- 59. Future Control Function
 - Y = none
- 60. Cabinet Style
 - YY = none (hideaway unit)
- 61. Cabinet Gauge
 - YY = none (no cabinet)
- 62. Cabinet Coating Type
 - Y = none
- 63. Insulation Type
 - F = fiberglass
 - C = close cell
 - X = special
- 64. Color- Cabinet
 - Y = none
- 65. Cabinet Height
 - 86 = standard 86"
 - KK = knockdown (2 pieces)
 - X = special

- 66. Discharge Air Arrangement (Primary Unit)
 - SSY = field selectable discharge locations, no baffle plate
- 67. Discharge Air Arrangement (Companion Unit) ("Slave")
 - SSY = field selectable discharge locations, no baffle plate
- 68. Fresh Air Damper
 - YS = filed selectable location, no damper control
 - YY = none
- 69. Extended Base (Height)
 - Y = none
- 70. Filter
 - 1 = 1" throwaway filter
 - X = special
- 71. Special Options
 - YYY = none
 - XXX = special
- 72. Filter
 - 3 = MERV3

Table 5: Model Number Description: Fields 73-78

Field	73	74	75	76
Code	S	S	Υ	S

73. Agency Listing

- U = UL, CUL
- S = UL, CUL, AHRI, MEA

74. Packaging

• S = Standard

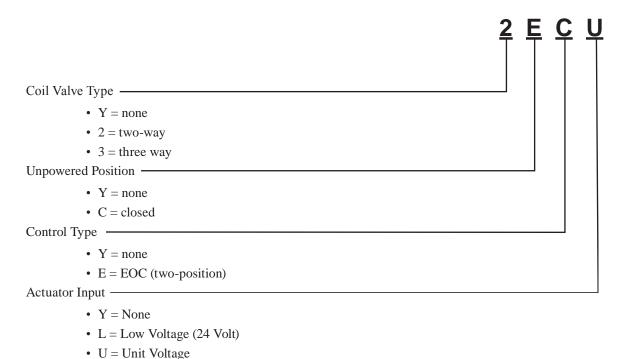
75. Extended Warranty

- Y = none (standard warranty)
- 1 = 1 year extended component warranty (30 month from shipment or 24 month from installation)
- 2 = 2 year extended component warranty (42 month from shipment or 36 month from installation)
- 3 = 3 year extended component warranty (54 month from shipment or 48 month from installation)
- 4 = 4 year extended component warranty (66 month from shipment or 60 month from installation)
- X = special

76. Product Style/Delivery

• S = standard (built to order)

Figure 15: Model Number Detail: Valve Package Fields 47—49



MT 155 Thermostat

Installation Manual

IM 1014

Group: Applied Air Systems

Part Number: 910102989

Date: August 2009

Installation

⚠ DANGER

READ THESE INSTRUCTIONS CAREFULLY BEFORE ATTEMPTING TO INSTALL, OPERATE OR SERVICE THIS THERMOSTAT.

Failure to observe safety information and comply with instructions could result in PERSONAL INJURY, DEATH AND/ OR PROPERTY DAMAGE.

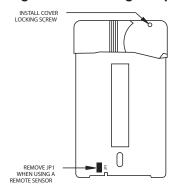
To avoid electrical shock or damage to equipment, disconnect power before installing or servicing. Use only wiring with insulation rated for full thermostat operating voltage. Use copper wire only. Insulate or wirenut all unused leads. Any wiring, including the remote probe, may carry the full operating voltage of the thermostat.

To avoid potential fire and/ or explosion do not use in potentially flammable or explosive atmospheres.

Retain these instructions for future reference. You must review your application and national and local codes to ensure that your installation will be functional and safe.

- Install the thermostat with the two furnished mounting screws to a standard 2" x 4" electrical box, 4-11/16" x 2-1/8" square device box with a 2" x 4" adapter ring or to a 4" x 4" box with accessory adapter plate.
- For wall installations, mount the thermostat on an inside wall approximately 5 feet above the floor. The location should provide circulation at average room temperature. Avoid direct sunlight or sources of hot or cold air in the room or wall.
- Remove the knob and then the cover. Mount thermostat base assembly to the outlet box using the screws provided, tighten the screws evenly but do not over tighten. Make wiring connections as noted.
- 4. To use a remote sensor, remove jumper JP-1 to disable local sensing. See Figure 1. Failure to remove JP-1 when using a remote sensor will cause improper operation of the thermostat. Some units do not have remote sensing capability. See Application Notes.

Figure 1: Removing Jumper JP-1



- 5. Reinstall the cover assembly. Install cover locking screw provided. Reinstall the knob.
- Checkout: After wiring and installation are complete, energize the system and check the operation. Adjust the thermostat as necessary to complete at least one cycle. Be sure the thermostat and all other equipment are functioning correctly.

Thermostat Operation

Temperature Range: 50°F - 90°F (10°C - 32°C)

TA155: A HEAT-OFF-COOL system switch manually selects heating or cooling mode. In the HEAT position, only the heat output cycles with demand. In the COOL position, only the cool output cycles with demand. In the OFF position, heating and cooling outputs are off. Units with a two position system switch or without a system switch must use a load transfer switch when both heating and cooling outputs are used. This prevents control failure and equipment damage caused by direct cycling between loads.

TB155: An ON-OFF system switch enables auto-changeover of heating and cooling modes. In the ON position the thermostat activates heating or cooling outputs dependant upon the relationship between set point and ambient temperature. Heat on to cool on dead band is 4°F. In the OFF position, heating and cooling outputs are off. Units without a system switch cycle between heating and cooling with a 4°F dead band.

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FAN: Some units have a switch for manual selection of fan speed. On these units fan operation is either internally wired for fan continuous operation or is dependant upon connection to the fan supply input. When internally wired for fan continuous operation, the fan will be off when the system switch is off. When dependant upon external connections the fan may not be off with the system switch in the off position. The fan supply input is switched to fan speed outputs (HI - MED - LO).

SWITCHED POWER: L1 power is switched to this output any time the system switch is out of the OFF position.

Ratings

Table 1: Fan and system switches

Voltage	Indu	Inductive		Dilet Duty	Thermostatic
Rating	FLA	LRA	Amps	Pilot Duty	Switching
24 VAC	N.A.	N.A.	N.A.	24 VA	10 VA
120 VAC	5.8	34.8	6.0	125 VA	20 VA
240 VAC	2.9	17.4	5.0	125 VA	20 VA
277 VAC	2.4	14.4	4.2	125 VA	20 VA

Wire Lead Colors (if applicable)

White with Orange Stripe	Fan High						
White with Red Stripe	Fan Med.						
White with Brown Stripe	Fan Low						
Red	Heat						
Blue	Cool						
Black	L1						
Yellow	L2 or Neutral						
Orange	Switched Power						
Violet	Fan Supply						
Brown	Remote Probe						
Brown	Remote Probe						

Application Notes

- 1. To use a remote sensor, remove jumper JP-1 to disable local sensing. See Figure 1. Failure to remove JP-1 when using a remote sensor will cause improper operation of the thermostat. Some units do not have remote sensing capability.
- 2. Units with remote sensing capability have a fourposition terminal block at TB1. If TB1 is two position the unit is local sensing only.
- 3. Remote probe wiring should be located away from any electrical motors or power wiring
- 4. Some units are internally wired for permanent fan continuous operation.

- 5. On units with a Fan Supply input, the operation of the fan is determined by wiring connection. For fan continuous, jumper the Fan Supply input (TB2-5) to the Switched Power output (TB3-3).
- For fan cycling operation with a call for heat or cool, a fan relay must be used.
- 7. Observe electrical ratings. Thermostatic outputs are pilot duty only.

Wiring Diagrams

Figure 2: Units with remote sensing capability

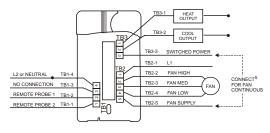


Figure 3: Units with switches used for local sensing only

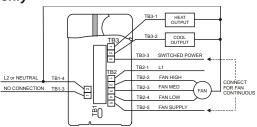


Figure 4: Units with no switches with local/remote sensing capability

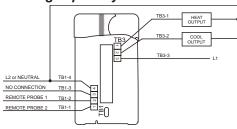
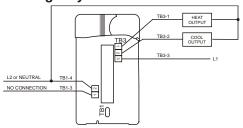


Figure 5: Units with no switches used for local sensing only





Installation Manual Group: Fan Coil Part Number: IM 1019 Date: October 2011

MT 180 Programmable Thermostat





Table of Contents

Installation Instructions3	Те
Applications and features	\$
Specifications	\$
Thermostat Model and Part Number	+
Optional Sensors/Kits4	+
Installing, Mounting and Wiring the Thermostat4	+
Operation6	j
Front Panel Reference6	j
Display Reference	j
Saving Changes	•
Up/Down Arrow Button Operation	•
System Button Operation	O _I
Fan Button Operation	
Program Button Operation	3
Function Overview	3
Setting the Clock & Day)
Setting the Temperature Display)
Programming Time & Temperature Settings 9)
Overriding the Program)
System Check-out	
Condensate Overflow Interrupt	
Thermostat Configuration/ Service Menu	

Technical and Application Notes	12
Fan Operation	12
Standard Fan Operation	12
Staged Fan Operation with	
Temperature Demand	12
Fancoil Operation	12
Pipe Sensor Operation	12
Purge Cycle Operation	12
HVACSetback Systems	13
Setback Operation - Remove JP3	13
Door Switch Only Operation - Install JP3	13
Optional Occupancy Detection Equipment Op	eration
14	
14 Occupancy Operation (Install JP3)	14
••	
Occupancy Operation (Install JP3) Operation From an Occupied Mode	14
Occupancy Operation (Install JP3)	14
Occupancy Operation (Install JP3) Operation From an Occupied Mode Operation From an Unoccupied Mode	14
Occupancy Operation (Install JP3)	14
Occupancy Operation (Install JP3) Operation From an Occupied Mode Operation From an Unoccupied Mode SB200-001 Occupancy Sensor	14141415
Occupancy Operation (Install JP3)	14141415
Occupancy Operation (Install JP3) Operation From an Occupied Mode Operation From an Unoccupied Mode SB200-001 Occupancy Sensor Operation	14 14 14 15 15
Occupancy Operation (Install JP3) Operation From an Occupied Mode Operation From an Unoccupied Mode SB200-001 Occupancy Sensor Operation SD200-001 Occupancy Sensor Operation SD200-002 Occupancy Sensor Operation	1414151515
Occupancy Operation (Install JP3) Operation From an Occupied Mode Operation From an Unoccupied Mode SB200-001 Occupancy Sensor Operation	1414151515

Installation Instructions

⚠ WARNING

- READ THESE INSTRUCTIONS CAREFULLY BEFORE ATTEMPTING TO INSTALL, OPERATE OR SERVICE THIS THERMOSTAT.
- Failure to observe safety information and comply with instructions could result in PERSONAL INJURY, DEATH AND/OR PROPERTY DAMAGE.
- To avoid electrical shock or damage to equipment, disconnect power before installing or servicing and use only wiring with insulation rated for full thermostat operating voltage.
- Before installing this control, the Voltage Selection Switch must be placed in the correct position. See instructions.
- To avoid potential fire and/or explosion do not use in potentially flammable or explosive atmospheres.
- Retain these instructions for future reference. This
 product, when installed, will be part of an engineered
 system whose specifications and performance
 characteristics are not designed or controlled by
 PECO. You must review your application and national
 and local codes to assure that your installation will
 be functional and safe.

A CAUTION

- Use copper wire only, insulate or wire nut all unused leads.
- Care should be used to avoid electrostatic discharge to the T180 thermostat.
- This unit has configuration jumpers. You may need to reconfigure this thermostat for your application

Applications and features

For 2 or 4 Pipe Fan Coil and On/Off Control Applications

- 7 Day, 4 Event Programmability
- · System Selection: Off-Heat-Cool-Auto-Setback
- 6 Outputs: 1H, 1C, Up to 3 Fan, OA Damper
- Fan Control: 1-3 Speeds
 - Cycling (Auto) or Continuous (On)
 - Automatic Fan Speed Staging (TB180 models only)

Connections for:

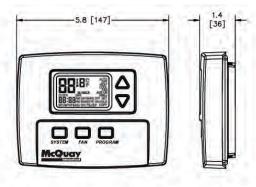
- Fan Coil Pipe Sensor
- Remote Temperature Probe
- · Occupancy Control
- · Door Switch or Setback
- Condensate Overflow

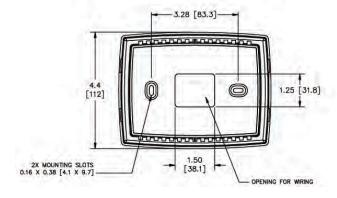
Specifications

Table 1: MT180 Programmable Thermostat Specifications Temperature

Set Point Range	50 to 90°F / 10 to 32°C					
Differential	1°					
Memory — Back-Up	EEPROM, No batteries required, Stores settings for unlimited time					
Mounting	Installs on standard 4" × 4" device box with a 2" × 4" horizontal mud ring					
Physical Dimensions	4.4"-H × 5.8"-W × 1.1"-D					
Agency Approvals	UL, UL Canada					
Electrical Ratings	(see Ratings table)					

Figure 1: MT180 Programmable Thermostat Dimensions





Installation Instructions

Thermostat Model and Part Number

Daikin offers two different 7-Day Programmable Digital Heating/Cooling Thermostat with constant fan or Fan cycled, On/Off Valve Control depending on the fan speed control used (See Table 2).

Table 2: Thermostat Model and Part Number

Model Number	Part Number	Fan Speed Control
TA180-001	910119110	3-speed fan control
TB180-001	910119111	Staged fan control

Optional Sensors/Kits

In addition to the T180 thermostat, Daikin offers optional sensors for occupancy detection (page 14 and page 15) and 10K pipe sensor page 12) that can be ordered and used in conjunction with the thermostat. Use the associated kit number(s) provided in Table 3 when ordering.

Table 3: Sensor Model and Kit Numbers

Sensor Model Number		Daikin Part Number
Occupancy	SB200-001	6677877311
Detection	SD200-001	6677877411
Sensor	SD200-002	6677877511
10K Pipe Sensor		107201601

Installing, Mounting and Wiring the Thermostat

The thermostat should be used indoors only. It should be mounted on an inner wall in a location with freely circulating air, and where it will be responsive to changes in room temperature. Avoid mounting near heat generating appliances (i.e. TV, heater, refrigerator), or in direct sunlight.

The thermostat base mounts to a field provided $4" \times 4"$ outlet box with a $2" \times 4"$ horizontal mud ring. The thermostat cover assembly mounts to the thermostat base.

⚠ CAUTION

Before applying power, the voltage selection switch must be in the appropriate position. Failure to select the correct voltage can cause thermostat malfunction or permanently damage the thermostat.

⚠ CAUTION

To use a remote sensor on units with local sensing capability, remove jumper JP1 to disable local sensing. Failure to remove JP1 can cause improper operation of the thermostat with a remote probe installed

CAUTION

- Use copper wire only. Insulate or wire nut all unused leads.
- Avoid electrostatic discharge to the thermostat.
- Failure to do so can cause thermostat malfunction or permanently damage the thermostat.

⚠ DANGER

Hazardous voltage. Combined load current is not to exceed 20 amps. Mount only to a grounded metallic box. Low voltage wiring is Class 2. To avoid electrical shock or Damage to equipment, disconnect power before installing or servicing. Failure to follow these instructions will result in death or serious injury

Figure 2: Mounting the Thermostat

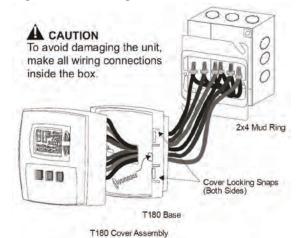
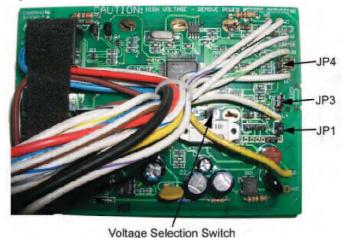


Figure 3: Circuit Board



Installation Instructions

- 1. Disconnect power before installing or servicing.
- 2. Run line voltage wiring (and low voltage wiring if applicable) into the field provided outlet box and mud ring (Figure 2).
- 3. Locate all connections within the mud ring/connection box and wire nut all unused wires.
- 4. Remove the thermostat cover assembly from its base to gain access to the circuit board (Figure 3).
- 5. On the circuit board, set the voltage selection switch (Figure 3) to the appropriate position prior to application of power.
 - 24V = 24 VAC
 - 110-277 V = 120, 240 or 277 VAC

NOTE: Note: The circuit board is shipped with the voltage selection switch in the 110-227 V position. For 24 VAC use, the switch must be in the 24 V position

6. The circuit board is also equipped with configuration jumpers (JP1, JP3, and JP4 in Figure 3). Depending on the application, it may be necessary to reconfigure the following jumpers:

JP1 Jumper Selection - Remote Temperature Sensor

- Local Sensing Install JP1
- Remote Sensing Remove JP1 Accessory sensors are available in standard 60" lengths but can be extended to meet application requirements.

JP3 Jumper Selection - HVAC Setback Systems

The JP3 jumper allows the T180 to be configured for Setback, Occupancy Detection or Door Switch Only Occupancy Operations. For further descriptions of these conditions please see the Technical and Application Notes, page 12.

- Setback Operation Remove JP3
- Occupancy Detection Install JP3
- · Door Switch Only Install JP3

JP4 Jumper Selection - 2 or 4 Pipe Operation

Connection of a pipe sensor will change the operation of the outputs as shown in Table 4. (See Technical Notes for further information on Pipe Sensor Operation, page 12)

- 2-Pipe Operation Install JP4 The thermostat will permanently disable the Secondary Output and disables system and fan invalid modes.
- 4-Pipe Operation Remove JP4 Both the Main Output (COOL) and Secondary Output (HEAT) will be available.
- Connect the color coded thermostat wires (Figure
 4) to the line voltage wires located in the mud ring/
 connection box and secure the connections with wire
 nuts.

8. Install the thermostat base to the mud ring/outlet box using two furnished mounting screws. Tighten the screws evenly but do not over tighten.

NOTE: Note: An output ratings chart (Table 5) is located on the inside of the base.

- 9. With the base now secured, verify that the circuit board is firmly snapped into the cover and is not dislodged.
- 10. Install the cover assembly to the base, pressing firmly to engage the cover locking snaps.

Figure 4: Wiring Diagram

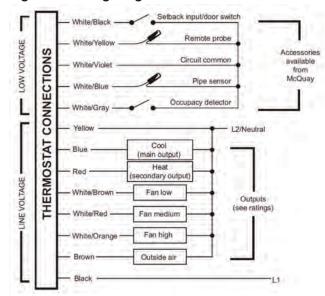


Table 4: Jumper Activation

JP4 Section	Pipe Sensor Water Temp	Aqua Stat	Main Output (Blue Wire)	Secondary Output (Red wire)
2-Pipe	Cold	Open	Cooling Only	Disabled
JP4-ON	Hot	Closed	Heating Only	Disabled
2-Pipe	Cold	Open	Cooling	Heating
JP4-OFF	Hot	Closed	Heating Only	Disabled

NOTE: *Fan will not cycle on for disabled modes.

Table 5: Output Ratings

Output Ratings					
Voltage	FLA	LRA	RES AMPS	PILOT DUTY	HP
24 VAC	NA	NA	NA	24 VA	NA
120 VAC	5.8	34.8	6.0	125 VA	1/4
240 VAC	2.9	17.4	5.0	125 VA	1/4
277 VAC	2.4	14.4	4.2	125 VA	1/4

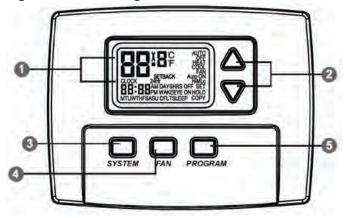
NOTE: Combined Load Current Not to Exceed 20 Amps

Front Panel Reference

The thermostat interface (Figure 5) contains buttons for use in navigating to accompanying menus/screens and for performing specific operations. These buttons and operations are described below.

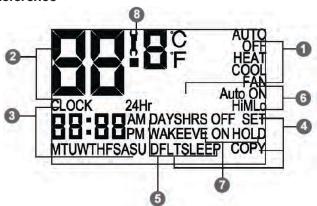
- 1. Liquid Crystal Display with a blue backlight
- 2. UP ▲ and DOWN ▼ Buttons
- 3. SYSTEM Button
- 4. FAN Button
- 5. PROGRAM Button.

Figure 5: MT180 Programmable Thermostat Interface



Display Reference

Figure 6: MT180 Programmable Thermostat Display Reference



1. System Mode Display

Table 6: System Mode Display Overview

Menu	Description
HEAT	Indicates the system is in heating mode
COOL	Indicates the system is in cooling mode
AUTO	Indicates the system will automatically changeover between heating and cooling modes as the room temperature varies
OFF	Turns off the entire system
SETBACK	Indicates the heating or cooling system is operating in setback mode. Setback mode is an energy saving feature that can be either manually activated by the thermostat's user, or automatically activated by an occupancy sensor or door switch

2. Temperature Display

Table 7: Temperature Display Overview

Menu	Description
Default Display	Digits display the current room temperature
During Programming	Digits are used to set the desired temperatures

3. Time and Day Display

Table 8: Time and Day Display Overview

Menu	Description
Default Display	Digits indicate the current time, and day abbreviations indicate the current day
During Programming	Digits and days are used to program time periods
CLOCK	Lights up during programming when the clock is being set
24Hr	Lights up during programming to indicate time will be displayed in 24-hour clock format
AM/PM	Indicates 12-hour clock format

4. Programming Commands

Table 9: Programming Commands Overview

Menu	Description
SET	Enters thermostat into custom program mode which allows you to specify a unique times and temperatures for a particular day or group of days
COPY	Simplifies programming by allowing you to copy all of an individual day's settings to another day or group of day
DFLT	Restores the thermostat to the factory program

5. Time Period Indicators

WAKE, DAY, EVE, and SLEEP are the names given to the four time periods per day. Each time period has its own unique setpoint temperatures as shown in Table 15.

6. Fan Operation Indicators

Table 10: Fan Operation Indicators Overview

Menu	Description
FAN	"FAN" will be always be lit in conjunction with "ON" or "AUTO"
ON	Indicates constant, continuous fan operation
AUTO	Indicates fan is only on with heating or cooling demand
Н	Indicates high speed fan; always lit in conjunction with "ON" or "AUTO"
M	Indicates medium speed fan; always lit in conjunction with "ON" or "AUTO"
LO	Indicates low speed fan; always lit in conjunction with "ON" or "AUTO"

7. Program Override Commands

Table 11: Program Override Commands Overview

Menu	Description
HOLD	Indicates thermostat is in manual operation. (Programmed settings are off, but not lost)
HOLD HRS	During programming, lights up in conjunction with clock digits; allows program to be put on hold for up to 24 hours
HOLD DAYS	During programming, lights up in conjunction with the clock digits; allows program to be put on hold for up to 99 days
HOLD ON	Indicates thermostat is in permanent manual operation
OFF	Turns off the hold and resumes programmed settings

8. Service Indicator

The wrench symbol is displayed when there is a temperature sensor error or condensate overflow error. It indicates there is an open or a short connection to the sensor switch. When this occurs, the thermostat will disable all outputs and illuminate the wrench symbol. A service technician should be called to determine the cause of the error.

Saving Changes

As you navigate your thermostat, be aware of the thermostat's save and exit protocol:

- The thermostat automatically saves all the changes you make, as you make them.
- When you are in the SYSTEM or FAN menus:
 - If you push a button that is not applicable to the current menu, all changes are saved and the thermostat goes to the menu associated with the button that was pushed.
 - If the thermostat is idle for five seconds, the thermostat times out, saves all changes, and returns to the thermostat's default display.

- When you are in the PROGRAM menu:
 - If you push a button that is not applicable to the current menu, nothing happens (your programming is not interrupted).
 - If the thermostat is idle for fifteen seconds, the thermostat times out, saves all changes, and returns to the thermostat's default display.

Up/Down Arrow Button Operation

The ▲ and ▼ buttons function in two ways:

- When you are in the default display, you can press ▲
 to increase, or ▼ to decrease, the current temperature
 setpoint. This will override programmed temperature
 settings until the next programmed time period (Wake,
 Day, Evening, or Sleep).
- When you are in the PROGRAM menu, you can press

 ▲ to scroll up, or ▼ to scroll down, through the menu, time, and temperature options.

System Button Operation

Pressing SYSTEM will light up the five system mode options described below. Press SYSTEM to scroll through the options. As you scroll, the current option will be blinking. To select the blinking option, wait for the five-second timeout, which saves your option and returns you to the thermostat's default display.

Table 12: System Button Operation Overview

Menu	Description
HEAT	The thermostat operates as a Heating Only thermostat
COOL	The thermostat operates as a Cooling Only thermostat
AUTO	The thermostat automatically selects the appropriate Heat or Cool mode depending upon the setpoint (desired temperature) and zone temperature (actual temperature)
OFF	Turns the system off by disabling all thermostat outputs
	Setback mode is an energy saving feature that minimizes the heating and cooling when the room is not occupied. Setback mode overrides the programmed time and temperature settings by telling the thermostat to instead use the setback setpoint for heating and cooling. The setback setpoint temperatures are factory default or installer-selected during installation. During setback mode, when a demand for heating or cooling exists, the fan will run at the lowest speed.
SET BACK	Automatic setback mode: If your thermostat is connected to an occupancy sensor or door switch, setback mode is automatically turned on and off by the sensor or door switch.
	Manual setback mode: Select SETBACK in the SYSTEM menu. Setback temperature settings will remain in effect until you manually turn off setback mode. Selecting HEAT, COOL, or AUTO in the SYSTEM menu will turn off setback and resume your programmed time and temperature settings

NOTE: SETBACK appears on your menu only if the thermostat's installer enabled this feature.

Fan Button Operation

Pressing FAN will light up the six fan mode options described below. Press FAN to scroll through the options. As you scroll, the current option will be blinking. To select the blinking option, wait for the five-second timeout, which saves your option and returns you to the thermostat's default display.

Table 13: Fan Button Operation Overview

Menu	Description
ON HI	High speed fan is on continuously, even if no demand for heating or cooling exists
ON M	Medium speed fan is on continuously, even if no demand for heating or cooling exists
ON LO	Low speed fan is on continuously, even if no demand for heating or cooling exists
AUTO HI	High speed fan cycles with active demand for heating and cooling
AUTO M	Medium speed fan cycles with active demand for heating and cooling
AUTO LO	Low speed fan cycles with active demand for heating and cooling

Program Button Operation

Function Overview

Pressing PROGRAM lights up five program mode options, described below. Press ▲ or ▼ buttons to scroll through the options. As you scroll, the current option will be blinking. To select the blinking option, press PROGRAM again and you will be taken to the menu associated with that option.

Table 14: Program Button Operation Overview

Menu	Description
CLOCK	Sets the current time and day.
°F/°C	Use this option to change the temperature display to Fahrenheit or Celsius. Your thermostat's default temperature display setting is Fahrenheit.
SET	Use to specify the time and temperature programming for a particular day or group of days. Also allows you to reset the thermostat to the factory default ENERGY STAR program.
COPY	Simplifies programming by allowing you to copy a particular day's program to another day or group of days.
HOLD	Puts the thermostat in manual operation for a permanent or temporary time period. Overrides your programmed settings, but does not lose them.

Setting the Clock & Day

- 1. Press PROGRAM once.
- 2. Press ▲ or ▼ to scroll until "CLOCK" is blinking. To select, press PROGRAM once.
- Press ▲ or ▼ to scroll through "24Hr", "AM", "PM" options. "24Hr" sets your thermostat to a 24-hour clock. "AM" and "PM" sets your thermostat to a 12-hour clock. To select your preference, press PROGRAM once.
- 4. Press ▲ or ▼ to scroll to the current hour. To select, press PROGRAM once.
- Press ▲ or ▼ to scroll to the current minute. To select, press PROGRAM once.
- 6. Press ▲ or ▼ to scroll to the current day. To select, press PROGRAM once.

Your selections have been saved and you have exited program mode. Your thermostat is ready to function with the factory pre-programmed ENERGY STAR® program. If you want to change the program for your particular needs, follow the instructions in the "Programming Your Thermostat" section.

Setting the Temperature Display

- 1. Press PROGRAM once.
- 2. Press ▲ or ▼ to scroll until "oF oC" is blinking. To select, press PROGRAM once.
- 3. Both "F" and "C" will be lit, but only one will be blinking. Press ▲ or ▼ to scroll so that the preferred option is blinking. To select, press PROGRAM once.

Your selection has been saved and you have exited program mode.

Programming Time & Temperature Settings

Your thermostat's programming feature allows you to divide up a 24-hour day into four time periods (referred to as "Wake", "Day", "Evening", and "Sleep"), and give each time period its own setpoint temperatures. Your "Heat Setpoint temperature" tells your heating system the room temperature to maintain during cold weather. The "Cool Setpoint Temperature" tells your cooling system the room temperature to maintain during hot weather.

Factory Program: Your thermostat comes from the factory preprogrammed with all seven days of the week set to the times and temperatures shown in Table 15.

Table 15: Factory Set-Up of Time & Temperature Settings

Time Period	Start Time	Heat Setpoint Temperature	Cool Setpoint Temperature
Wake	6:00 am	70°F (21.0°C)	78°F (25.5°C)
Day	8:00 am	62°F (16.5°C)	85°F (29.5°C)
Evening	6:00 pm	70°F (21.0°C)	78°F (25.5°C)
Sleep	10:00 pm	62°F (16.5°C)	72°F (22.0°C)

If the factory program meets your needs, simply follow the "Setting the Clock & Day" instructions and you're done. If you want to change the pre-programmed times and/or temperatures, follow the instructions under "Custom Program".

Custom Program

Begin by planning your program. Use the "Custom Program Worksheet" to plan your program time periods and temperatures you want during each period. You must program four periods for each day. Fill in the complete table, as it will serve as a record of your programs, then follow this procedure:

- 1. Press PROGRAM once.
- 2. Press ▲ or ▼ to scroll until "SET" is blinking. To select, press PROGRAM once.
- 3. Press ▲ or ▼ to scroll to the day or group of days you want to program. To select your preference, press PROGRAM once.

Day / Group of Days options are:

- To program each day individually, the abbreviations are: "M" is Monday, "TU" is Tuesday, "W" is Wednesday, "TH" is Thursday, "F" is Friday, "SA" is Saturday, and "SU" is Sunday.
- "MTUWTHFSASU" allows you to give all 7 days of the week the identical heating & cooling program.

- "MTUWTHF" allows you to give all 5 weekdays the identical heating & cooling program.
- "SASU" allows you to give both weekend days the identical heating & cooling program.
- "DFLT" restores all seven days of the week to the original factory pre-programmed ENERGY STAR program.
- 4. Press ▲ or ▼ to scroll through the four time periods. To select your preference, press PROGRAM once.
- 5. Press ▲ or ▼ to scroll to the desired starting hour. To select, press PROGRAM once.
- 6. Press ▲ or ▼ to scroll to the desired starting minute. To select, press PROGRAM once.
- 7. Press ▲ or ▼ to scroll to the desired HEAT setpoint temperature. To select, press PROGRAM once.
- 8. Press ▲ or ▼ to scroll to the desired COOL setpoint temperature. To select, press PROGRAM once.

Copy Feature

- 1. Press PROGRAM once.
- 2. Press ▲ or ▼ to scroll until "COPY" is blinking. To select, press PROGRAM once.
- 3. Press ▲ or ▼ to scroll to the individual day you want to copy from. "DFLT" (the default Factory Program) is also a copy option. To select your preference, press PROGRAM once.
- 4. Press ▲ or ▼ to scroll to the day or group of days you want to copy to. To select, press PROGRAM once.

Your selection has been saved and you have exited program mode.

Time & Temperature Programming Example

In this example, the thermostat user wants to program the weekend with a different schedule from the Factory Program. The user wants the Saturday and Sunday program to be identical.

- 1. Press PROGRAM once.
- 2. Press .or .to scroll until "SET" is blinking. To select, press PROGRAM once.
- 3. Press .or .to scroll until "SASU" is blinking. To select, press PROGRAM once.
- 4. Press ▲ or ▼ to scroll until "WAKE" is blinking. To select, press PROGRAM once.
- 5. Press ▲ or ▼ to scroll hours to "8: ". To select, press PROGRAM once.
- 6. Press ▲ or ▼ to scroll minutes to ":30". To select, press PROGRAM once.
- 7. User wants to keep same HEAT setpoint temperature. To keep unchanged, press PROGRAM once.
- 8. User wants to keep same COOL setpoint temperature. To keep unchanged, press PROGRAM once.

Now you're done setting up the Wake period, and ready to set up the other three time periods for Saturday and Sunday:

- Program the Day period for SASU by repeating steps 1 through 8, but in Step 4, select "DAY".
- Program the Evening period for SASU by repeating steps 1 through 8, but in Step 4, select "EVE".
- Program the Sleep period for SASU by repeating steps 1 through 8, but in Step 4, select "SLEEP".

Now you're done setting up all four time periods for SASU.

Overriding the Program

Your thermostat's HOLD feature allows you to put the thermostat in manual operation for either a specified or indefinite length of time. HOLD will override your programmed settings, but does not lose them.

Setting up a Temporary Hold

You may set up a temporary hold by hours and/or days.

- 1. Press PROGRAM once.
- 2. Press ▲ or ▼ to scroll until "HOLD" is blinking. To select, press PROGRAM once.
- 3. Press ▲ or ▼ to scroll through options. "DAYS" allows you to specify 0-99 days hold; "HRS" allows you to specify 0-24 hours hold. To select your preference, press PROGRAM once.
- 4. Press ▲ or ▼ to scroll to the desired length of time. To select, press PROGRAM once.

The thermostat is now on hold for the time period you selected, unless you decide to turn it off earlier. (See Turning off a Hold.)

Setting up a Permanent Hold

- 1. Press PROGRAM once.
- 2. Press ▲ or ▼ to scroll until "HOLD" is blinking. To select, press PROGRAM once.
- 3. Press ▲ or ▼ to scroll to "ON". To select, press PROGRAM once.

The thermostat is now on hold until you manually turn off the hold. (See Turning off a Hold.)

Turning off a Hold

- 1. Press PROGRAM once.
- 2. Press ▲ or ▼ to scroll until "HOLD" is blinking. To select, press PROGRAM once.
- 3. Press ▲ or ▼ to scroll to "OFF". To select, press PROGRAM once.

The thermostat will now resume your programmed time and temperature settings.

For an easy planning refer to the Custom Program Worksheet (Annex I, page 16).

System Check-out

To verify thermostat operation after mounting and wiring it, perform the following:

- 1. Energize the system.
- 2. Set fan to ON. Select each fan speed (TA180 Models) to verify operation.
- 3. Set the System button to AUTO, or available selection.
- 4. Using the UP arrow, adjust temperature more than 5°F above the room temperature to cycle on heating.
- 5. Using the DOWN arrow adjust the temperature to 5°F below room temperature to cycle on cooling.

NOTE: If the thermostat is set to utilize a time-based purge cycle (Service menu 16), the thermostat will conduct a 3-min purge on initial start-up if a pipe sensor is connected.

Appendix

Operation

Condensate Overflow Interrupt

The remote probe input can be used with a condensate overflow interrupt switch (CO), either in conjunction with a remote probe (normally closed CO switch) or with local sensing (normally open CO switch). When the condensate switch activates, the T180 will display the service wrench and disable all outputs.

Figure 7: Remote probe installation

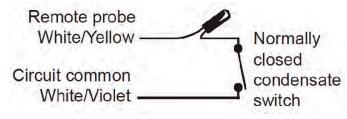
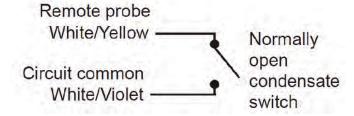


Figure 8: Local sensor installation



Thermostat Configuration/ Service Menu

To enter the Service Menu press the UP and DOWN arrows simultaneously for five (5) seconds. The current display icon will be turned off.

Service menu number 1 will appear. Push the SYSTEM button to move to the next Service Menu number. The UP and DOWN arrow keys will scroll through your range of options for each feature. All changes to the Service Menu are automatically saved when the system times out. Please refer to the service menu table (Annex II, page 17).

Technical and Application Notes

Fan Operation

The thermostat may be factory configured for standard or staged fan operation.

Standard Fan Operation

Table 16: Standard Fan Operation Overview

Menu	Description
FAN ON	Fan is on continuously and is not dependant on a heat or cool demand
FAN AUTO	Fan cycles on with a heat or cool temperature demand and cycles off with the heat or cool output
FAN SPEED	High, medium, or low is selected by the user

Single setpoint represented in Figure 9. Programming mode includes multiple setpoints.

Staged Fan Operation with Temperature Demand

Table 17: Staged Fan Operation with Temperature Demand Overview

Menu	Description
FAN ON	Fan stages from high to medium to low and stays continuously on in the lowest available speed
FAN AUTO	Fan stages from high to medium to low and cycles off at set point
FAN SPEED	selected by the thermostat program

Single setpoint represented in Figure 10. Programming mode includes multiple setpoints.

Figure 9: Standard Fan Operation

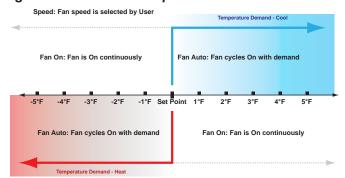
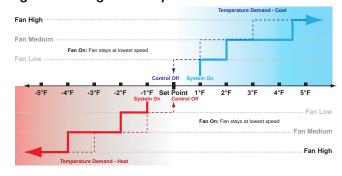


Figure 10: Staged Fan Operation



Fancoil Operation

Fancoil operation is either a 2-pipe or 4-pipe configuration which is determined by jumper selection JP4 (see Installing, Mounting and Wiring the Thermostat, page 4).

Pipe Sensor Operation

A pipe sensor can be connected when the thermostat is configured for either 2-pipe or 4-pipe fan coil operation (see JP4 jumper configuration). The Pipe sensor is used to determine the water temperature in the Main Coil. The Pipe Sensor should be mounted on the Main Coil supply and wrapped with insulating material.

Pipe Sensor Input: 10K Remote Probe or a standard On-Off Aqua-stat can be used for summer/winter changeover. ON (closed) is winter heating mode and OFF (open) is summer cooling mode.

Purge Cycle Operation

With a pipe sensor connected, this thermostat will initiate a purge cycle if the sensed water temperature is ambiguous (not adequately hot or cold). The purge cycle algorithm can be either temperature or time based, depending on the configuration of Service Menu 16.

Technical and Application Notes

Temperature-Based Purge

- When an Ambiguous mode is detected and a demand exists, a 3 minute purge timer begins and the Main Output is opened.
- After the 3 minute purge cycle, the thermostat checks again to see if the water temperature is more than 15°F from set point, or above 80°F or below 60°F.
- If Winter or Summer mode is determined, normal HVAC operation occurs. If still ambiguous, the thermostat checks to see if the COIL temperature is below 60°F or above 80°.
 - Coil $< 60^{\circ}$ F = Summer Mode.
 - Coil $> 80^{\circ}$ F = Winter mode.
- Purge Cycle is repeated until a non-ambiguous condition is sensed.

NOTE: If at any time the demand goes away, the thermostat will abort the purge cycle.

Time-Based Purge (Default)

- 1. The time-based purge cycle will start a 3-min purge cycle and enable the Main Output if any of the following conditions occur: transition from OFF to AUTO mode, Reset event, power cycle, and/or 1-hour timer expires.
- 2. After the 3 min purge cycle, a pipe sensor reading says: Pipe is 15°F+ below the zone temp = Summer mode Pipe is 15°F+ above the zone temp = Winter mode Pipe is within 15°F of zone temp = still Ambiguous 3 If a Winter or Summer mode is determined, the appropriate heating/cooling occurs. The thermostat will purge and check pipe temperatures again after 1-hour.

If step 2 is still ambiguous, all thermostat outputs are disabled for 1 hour.

After 1 hour, the purge cycle resumes at step

HVACSetback Systems

Setback Operation - Remove JP3

This is a low level input that is normally open. When switch is closed, the T180 heating and cooling setback limits are used as temperature control points. Fan operation in setback is cycled with demand. Pressing any button will override setback for 1 hour. Setback will override any user setting unless control is turned to OFF.

Intelligent Occupancy Sensors like the SD200-001 and SD200-002 can be used with this input to set the HVAC system to control at setback limits.

Door Switch Only Operation - Install JP3

A stand alone door or window switch can be connected to the T180 to disable the HVAC system (outputs) if a door or window is left open for more than 2 minutes. A one-time ten minute override can be initiated by pressing any thermostat key pad.

Optional Occupancy Detection Equipment Operation

The T180 thermostat can be used with optional S200 series occupancy detection equipment. Purchasing and installing this equipment to compliment the thermostat adds energy savings by setting back HVAC operation during occupied and unoccupied times.

Occupancy Operation (Install JP3)

The T180 can be used with PECO S200 series occupancy detection equipment. The occupancy and switch inputs are designed to connect to the SB200 slave sensor and SE200 door switch.

The Occupancy Sensor is a low-level switch that is open when there is occupancy and closed when unoccupied.

The Door Switch is a low-level switch that is open when the door is open and closed when the door is closed. This system requires both an Occupancy Sensor and a Door Switch.

Operation From an Occupied Mode

The T180 operates normally and looks for a door close. A door close signal initiates occupancy status detection.

If occupancy is detected, the T180 will maintain normal HVAC control. It then waits for a door open signal before determining occupancy again.

If no occupancy signal is detected within 2 minutes, the T180 changes to unoccupied mode and controls at setback temperature values.

Operation From an Unoccupied Mode

In an Unoccupied State, the T180 sets heating and cooling set points to setback values, as determined in the service menu. In this mode, the fan is automatically set to cycle with demand.

The T180 will continually monitor the room for occupancy.

Any occupancy detection, including door open, will set the operation to occupied mode.

In either mode, if the door is left open for more than 2 minutes the T180 will disable the HVAC system. A one-time ten minutes override can be initiated by pressing any thermostat keypad.

Optional detection equipment configurations and operation are described below.

SB200-001 Occupancy Sensor

The SB200-001 occupancy sensor (Figure 11) serves as an occupancy sensor for automatic control of a guest room HVAC system. It incorporates an innovative dual delay processor which allows the sensor to verify the nature of occupancies, and is capable of eliminating unnecessary actuations of the HVAC device due to unintentional passages or short time occupancies. The sensor may also serve as a slave sensor (Figure 12, page 15).

The sensor switch is open in occupied mode and closed in unoccupied mode. An optional door and/or window switch (Figure 11) is open when the door/window is open and is closed when the door/window is closed.

NOTE: To use this configuration, a jumper must be installed to JP3 to allow occupancy input.

NOTE: An optional door and/or window switch (Figure 11) can be added for use with the SB200-001 sensor.

Operation

In an occupied mode, the thermostat operates normally and looks for a door open signal. When the door opens, the thermostat waits for a door close signal. If the door is open for more than two minutes, the thermostat turns the HVAC system outputs to OFF. During this two minute period, if any button is pressed on the keypad, the time delay is extended to ten minutes. The time delay can only be extended once. Once the HVAC outputs transition to OFF, a door closure is required to re-enable the outputs. When the door closes, the thermostat starts a two minute timer and tries to detect occupancy. If the timer expires and no occupancy is detected, the thermostat transitions to an unoccupied state. If occupancy is detected while the timer is running, the thermostat will remain in the occupied mode.

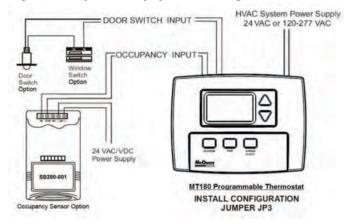
In an unoccupied mode, the thermostat sets heating and cooling set points to setback values as determined by factory or user settings. The fan is automatically set to cycle with demand. The thermostat continually monitors the occupancy sensor and will enter into occupied mode if occupancy is detected.

If the installation is only using a door/window switch, the thermostat will disable the HVAC outputs if this output is open for longer than two minutes.

To enable door/window switch only operation, install a jumper to JP3 (see Installing, Mounting and Wiring the Thermostat, page 4) and the occupancy input must be shorted to circuit common.

Optional Occupancy Detection Equipment Operation

Figure 11: Optional equipment configuration #1



SD200-001 Occupancy Sensor

The SD200-001 occupancy sensor (Figure 12) serves as a master sensor for a guest room HVAC management system. The sensor provides HVAC operation according to occupancy status, as well as door/window switch monitoring, selectable high/low temperature setback, form-C output, slave sensor connectivity, and a five minute door open HVAC shut-off.

NOTE: To use this configuration, the jumper to JP3 is removed to allow setback input.

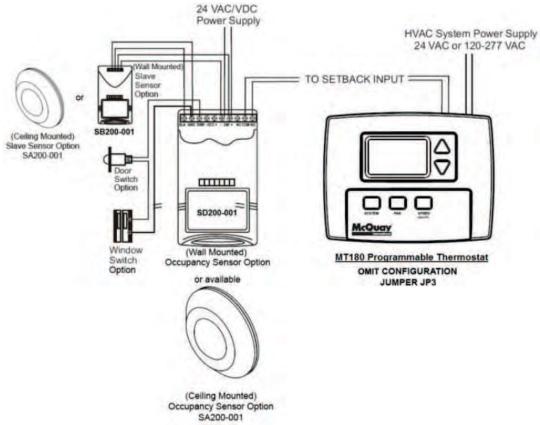
NOTE: An optional door and/or window switch (Figure 12) and slave sensor can be added for use with the

Operation

In an occupied mode, the SD200-001 occupancy sensor (Figure 12) and door switch use advanced microprocessor logic to determine occupancy. A door open signal will initiate occupancy status detection. If the sensor determines that a room is occupied, it will allow normal HVAC control. The sensor will wait for another door open signal before determining occupancy again.

In an unoccupied mode, the sensor continually monitors the room. Any occupancy detection will set the operation to occupied mode.

Figure 12: Optional equipment configuration #2



Optional Occupancy Detection Equipment Operation

SD200-002 Occupancy Sensor

The SD200-002 occupancy sensor serves as a stand alone master sensor for a guest room HVAC management system.

The sensor provides HVAC operation according to occupancy status, as well as selectable high/low temperature setback, form-C output, and a five minute door open HVAC shut-off.

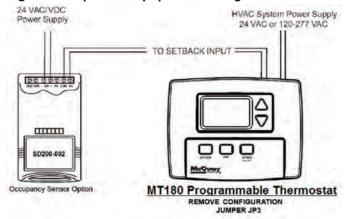
This system provides basic room setback and is ideal for control of HVAC in commercial spaces.

NOTE: To use this configuration, the jumper to JP3 is removed to allow setback input.

Operation

With each occupancy detection, an OFF delay is started and can be set to delay for up to 30 minutes (Figure 13).

Figure 13: Optional equipment configuration #3



Annex I

Table 18: Custom Program Worksheet

Day	Time Period	Start Time	Heat Setpoint Temperature	Cool Setpoint Temperature
	Wake			
Manday	Day			
Monday	Evening			
	Sleep			
	Wake			
Torredore	Day			
Tuesday	Evening			
	Sleep			
	Wake			
M/s dis s s de	Day			
Wednesday	Evening			
	Sleep			
	Wake			
Thursday	Day			
Thursday	Evening			
	Sleep			
	Wake			
Frido.	Day			
Friday	Evening			
	Sleep			
	Wake			
Octobrida	Day			
Saturday	Evening			
	Sleep			
	Wake			
Cup dov	Day			
Sunday	Evening			
	Sleep			

Annex II

Table 19: Service Menu Table

Menu	Feature	Range	Description / Comments
1	F° or C°	0- Celsius 1- Fahrenheit (Default)	Determines temperature displays in Fahrenheit or Celsius
3	Fan Off Delay	0-99 Seconds (0- Default)	The amount of time (in seconds) the lowest available fan speed will run after the thermostat outputs are disabled.
4	Range Low	50-90°F, 10-32°C (50°F- Default)	The lowest selectable temperature setpoint value.
5	Range High	50-90°F, 10-32°C (90°F- Default)	The highest selectable temperature setpoint value.
6	Setback Low	0-OFF 50-82°F, 11-27°C (55°F- Default)	The temperature setpoint value you want the thermostat to Heat to when the T180 is in the Setback mode.
7	Setback High	0- OFF 50-90°F, 11-32°C (90°F- Default)	The temperature setpoint value you want the thermostat to Cool to when the T180 is in the Setback mode.
8	Zone Temp Offset	+/- 9°F or +/- 4.5°C (0°F-Default)	Zone Temperature offset adjusts the sensed Zone Temperature displayed, allowing calibration in the field.
9	Keypad Lockout	No keypad lockout (Default) Disables System/Fan/Program Disables all buttons	This function blocks access to certain features of the device. The Service Menu is still available if the keypad lockout is enabled.
10	Fan Mode	1- ON 2- Auto 3- ON or Auto (Default)	ON- Fan is always on, regardless of demand. Auto-Fan is only on with heating or cooling demand. ON or Auto-User can choose either selection.
11	Fan Speeds	1- High 2- Low, High 3- Low, Med, High (Default)	Speeds which are selectable by the user.
12	System Mode	OFF, Auto OFF, Heat, Cool, Auto (Default) OFF, Heat, Cool Heat, Cool, Auto	Sets the system modes the occupant is able to select.
13	Controlled Off or Off Override	0- Disable (Default) 1- Enable	When enabled, the unit will control to the Setback setpoints. This function will also override the user mode setting of OFF if the room temperature is equal to or above the Cool Setback setpoint or equal to or below the Heat Setback setpoint.
14	Front Panel Setback Control	0- Disable (Default) 1- Enable	When enabled, Setback is shown as an available system mode selection. If Setback mode is selected, the thermostat will control to the current Setback Heat and Setback Cool setpoints.
15	Cycled Outside Air Damper	0- Cycles (Default) 1- Continuous	The Outside Air output will cycle with heat or cool demand if Cycles mode is chosen. The Outside Air output is active anytime the thermostat is out of the OFF mode when Continuous mode is chosen. When in Setback the Outside Air output will turn off.
16	Temperature Based Purge Cycle	0- Time Based (Default) 1- Temperature Based	Determines if the Purge Cycle will be Temperature or Time Based.
17	Minimum Dead Band Adjustment	3°F (Default) 3-10°F, 1.5-5°C	A changeover deadband value prevents short cycling between Heating and Cooling modes. The value is adjustable to meet various HVAC system requirements.
18	Factory Default Reset	0- Disable (Default) 1- Enable	Toggles between OFF and DFLT. When factory default is desired, select DFLT.
25	Pre-Occupancy Purge	0 Hours (Default) 0-3 Hours	Energizes Fan Low for selected number of hours (0-3) prior to events Wake (Occupied 1) and Day (Occupied 2)
30	Cycles Per Hour (CPH) Cooling	3 CPH (Default) 0-6 CPH	Defines the number of cycles per hour for cooling. A selection of 0 disables cycling.
32	Cycles Per Hour (CPH) Heating	5 CPH (Default 0-12 CPH)	Defines the number of cycles per hour for heating. A selection of 0 disables cycling.
35	Heat Recovery Rate	5°F/Hr (Default) 0-18°F/Hr 0-10°C/Hr	Defines the rate in which the device achieves the comfort setpoint. 0 disables ramp recovery.
36	Cool Recovery Rate	5°F/Hr (Default) 0-18°F/Hr 0-10°C/Hr	Defines the rate in which the device achieves the comfort setpoint. 0 disables ramp recovery
40	Minimum Off Time	4 Minutes (Default) 1-10 Minutes	Sets the minimum off time for both heat and cool output
45	Intermittent Fan	0- Disable (Default) 1- Enable	If enable is selected, the intermittent fan will operate during setback operation. (Default values will be used unless menu 46 and 47 are adjusted.)
46	Intermittent Fan-On Time	5 Minutes (Default) 1-60 Minutes	Defines the duration in which fan low will be on. Fan On will be activated afterFan Off time has passed.
47	Intermittent Fan-Off Time	25 Minutes (Default) 0-60 Minutes	Defines the duration in which fan low will be off. Fan Off will be activated after Fan On time has passed. A selection of 0 will result in continuous Fan.
71	Revision	_	Upon menu selection, the firmware and configuration revision will be displayed.
80	System Test Main Output (Cool)	0- Disable (Default) 1- Enable	If enable is selected, it will activate the main output (cool output) for 10 minutes. Fan High will automatically turn on. If a different menu is selected the output will be disabled.
81	System Test Main Output (Heat)	0- Disable (Default) 1- Enable	If enable is selected, it will activate the secondary output (heat output) for 10 minutes. Fan High will automatically turn on. If a different menu is selected the output will be disabled.
82	System Test Fan Output	0- Disable (Default) 1- Enable Fan Low Output 2- Enable Fan Medium Output 3- Enable Fan High Output	If enable is selected, it will activate the fan output for 10 minutes. If a different menu or a different fan speed is selected the output will be disabled.

Installation Manual

IM 1015

Group: Applied Air Systems

Part Number: **910102990**

Date: August 2009

MTA 158 Microprocessor Thermostat On/Off Controller

Installation

⚠ DANGER

READ THESE INSTRUCTIONS CAREFULLY BEFORE ATTEMPTING TO INSTALL, OPERATE OR SERVICE THIS THERMOSTAT.

Failure to observe safety information and comply with instructions could result in PERSONAL INJURY, DEATH AND/ OR PROPERTY DAMAGE.

To avoid electrical shock or damage to equipment, disconnect power before installing or servicing. Use only wiring with insulation rated for full thermostat operating voltage. Use copper wire only. Insulate or wirenut all unused leads. Any wiring, including the remote probe, may carry the full operating voltage of the thermostat.

To avoid potential fire and/ or explosion do not use in potentially flammable or explosive atmospheres.

Retain these instructions for future reference. You must review your application and national and local codes to ensure that your installation will be functional and safe.

⚠ CAUTION

Care should be used to avoid electrostatic discharge to the microprocessor.

This unit has configuration dip switches and jumpers. You may need to reconfigure the thermostat for your application.

- 1. Install the thermostat with the two furnished mounting screws to a standard 4-11/16" × 2-1/8" square device box with a 2" × 4" adapter ring.
- For wall installations, mount the thermostat on an inside wall approximately 5 feet above the floor. The location should provide circulation at average room temperature. Avoid direct sunlight or sources of hot or cold air in the room or wall.
- Remove the cover. Mount thermostat base assembly to the outlet box using the screws provided, tighten the screws evenly but do not over tighten. Connect wires as shown in the appropriate wiring diagram for your thermostat style.

 To use a remote sensor on units with local sensing capability, remove jumper JP-1 to disable local sensing. Failure to remove JP-1 will cause improper operation of the thermostat.

Figure 1: Wiring Diagram for On/Off Output Configuration

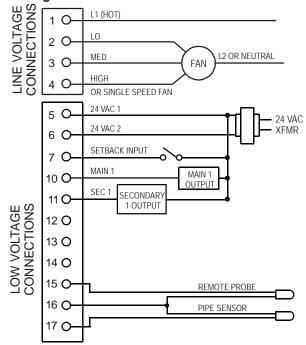


Table 1: MTA 158 Operation*

Output	Off with Demand	On with Demand
Main 1 (Terminal 10)	On at temperature demand	On at Temperature Demand
Main 2 (Terminal 12)	NA	NA
Secondary (Terminal 11)	Summer: Off with heat demand	Summer: On with heat demand
(Terminal 11)	Winter: Disabled	Summer: Disabled
Secondary 2 (Terminal 13)	NA	NA

Note: * Operation determined by configuration. See Dip Switch Configuration Table

- 5. Remove the LCD plastic protective film. Reinstall the cover assembly. Install the cover locking screw provided in the hole at the left side of the control enclosure to complete the installation.
- 6. **Checkout:** After wiring and installation are complete, energize the system and check the operation. Adjust the thermostat as necessary to complete at least one cycle. Be sure the thermostat and all other equipment are functioning correctly.

Thermostat Operation

These thermostats are designed to control On-Off, N.O. and N.C. valves, relays and Erie® three wire floating valves. These units may include a fan switch with one or more fan speed selections.

Mode Button Operation

OFF: All thermostat outputs are off, fan is still operational if connected to manual fan speed switch.

AUTO: The thermostat automatically selects heating or cooling mode depending on the set point and room temperature. The appropriate HEAT or COOL indicator is enabled in addition to AUTO. A 3°F dead-band is provided to prevent short cycling between heating and cooling modes. After change-over the control points automatically shift so that the heating off-point or the cooling off-point equals the set point temperature.

COOL: The thermostat operates as a cooling-only thermostat. The heating outputs are disabled.

HEAT: The thermostat operates as a heating-only thermostat. The cooling outputs are disabled.

If constructed without a mode button, the thermostat operates in Auto mode, subject to configuration of the 2/4 pipe jumper and pipe sensor input.

Fan Speed Switch Operation

Fan speed is determined by manual selection from fan switch OFF to HIGH, MEDIUM and/ or LOW. In units with the Cycling Fan Option (demand output), the Fan operation (CYCLING vs. CONTINUOUS) is determined by application connections. In OFF position all outputs are off and display blank.

Up/ Down Arrow Operation

A first touch of either arrow will display the set point (a single set point is employed for both heating and cooling). Continued pressure on either arrow will scroll the set point to new values. After three seconds with no pressure on either arrow, the selected set point becomes effective and the display of the room temperature resumes.

Setback Operation

Connection of the Setback Input to 24 VAC 1 will force the control into unoccupied mode (see wiring diagram). Pressing an arrow key or the mode button on the thermostat cover will disable the setback input for one hour.

Pipe Sensor Operation

If cold water is detected, the system will operate in summer mode and the Main output will be cooling. If hot water is detected, the system will operate in winter mode, the Main output will be heating and First Stage Secondary Output will be disabled. In the case of an ambiguous reading, neither hot nor cold, the thermostat will initiate a purge cycle.

Ratings

Table 2: Fan and system switches

Voltage	Indu	ctive	Resistive	Resistive Amps Pilot Duty	Thermostatic
Rating	FLA	LRA	Amps		Switching
24 VAC	N.A.	N.A.	N.A.	24 VA	10 VA
120 VAC	5.8	34.8	6.0	125 VA	NA
240 VAC	2.9	17.4	5.0	125 VA	NA
277 VAC	2.4	14.4	4.2	125 VA	NA

Service Menu

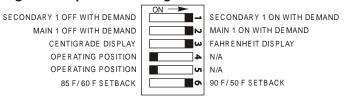
Access: Press UP and DOWN arrows for 5 seconds.

Menu Selection: Select 1 to 5 by pressing the mode button or by pressing the UP and DOWN arrows simultaneously.

Adjust Value: Use UP or DOWN arrow.

Item #	Function	Range	Default
1	Zone Temp Offset	-5.1 F to 5.1 F	0F
2	Valve Stroke Time	30 sec. To 5 min.	120 sec.
3	Fan Delay to OFF	0 to 10 Minutes	0 Sec.
4	Compressor Mini- mum Off Time	30 Sec. To 10 min.	120 Sec.
5	Purge Cycle	0 = Time Based 1 = Temperature Based	1

Figure 2: Dipswitch Configuration



EXAMPLE: This Dip Switch Is Configured For On With Demand, °F Display, On/ Off Operation and 90/50°F Setback.

NOTE: Thermostat power must be cycled for changes in dip switch configuration to take effect

Figure 3: Circuit Board Jumpers

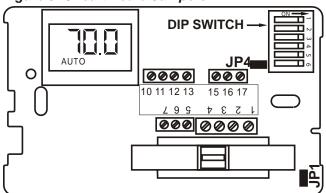


Table 3: Circuit Board Jumper Configuration

Jumper Designation	Jumper Installed: ON	Jumper Removed: OFF
JP1	Local Sensing	Remote Sensing
JP4	2 Pipe System*	4 Pipe System

Application Notes

- 1. When no pipe sensor is used the main output controls cooling and the secondary output controls heating.
- 2. The pipe sensor should be mounted on the main coil input for water system operation and in the main duct system for forced air operation.
- 3. The set point and operating mode will be retained on a loss of power.
- 4. When using either a remote probe or pipe sensor, run wiring away from any electrical motors or power wiring.

Power-Up Operating Sequence

Upon application of power, an MTA158 will go directly to normal operation.



Installation Manual

IM 1016-1

Group: Applied Air Systems

Part Number: 910102991
Date: November 2010

MTB 158 Microprocessor Thermostat On/Off and 3-Wire Controller

General

⚠ DANGER

READ THESE INSTRUCTIONS CAREFULLY BEFORE ATTEMPTING TO INSTALL, OPERATE OR SERVICE THIS THERMOSTAT.

Failure to observe safety information and comply with instructions could result in PERSONAL INJURY, DEATH AND/ OR PROPERTY DAMAGE.

To avoid electrical shock or damage to equipment, disconnect power before installing or servicing. Use only wiring with insulation rated for full thermostat operating voltage. Use copper wire only. Insulate or wirenut all unused leads. Any wiring, including the remote probe, may carry the full operating voltage of the thermostat.

To avoid potential fire and/ or explosion do not use in potentially flammable or explosive atmospheres.

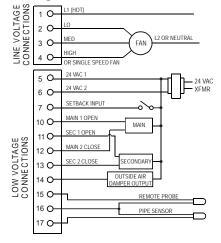
Retain these instructions for future reference. You must review your application and national and local codes to ensure that your installation will be functional and safe.

⚠ CAUTION

Care should be used to avoid electrostatic discharge to the microprocessor.

This unit has configuration dip switches and jumpers. You may need to reconfigure the thermostat for your application.

Figure 1: Wiring Diagram for 3-Wire Valve Configuration



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Figure 2: Wiring Diagram for On/Off Ouput Configuration

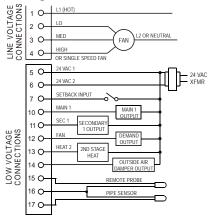


Table 1: Ratings

	F	an and sys	stem switche	s	Thermostatic
Voltage Rating	Inductive		Resistive	Pilot	Switching
rtating	FLA	LRA	Amps	Duty	(Pilot Duty)
24 VAC	N.A.	N.A.	N.A.	24 VA	10 VA
120 VAC	5.8	34.8	6.0	125 VA	NA
240 VAC	2.9	17.4	5.0	125 VA	NA
277 VAC	2.4	14.4	4.2	125 VA	NA

Installation

- 1. Install the thermostat with the two furnished mounting screws to a standard 4-11/16" × 2-1/8" square device box with a 2" × 4" adapter ring.
- For wall installations, mount the thermostat on an inside wall approximately 5 feet above the floor. The location should provide circulation at average room temperature. Avoid direct sunlight or sources of hot or cold air in the room or wall.
- 3. Remove the cover. Mount thermostat base assembly to the outlet box using the screws provided, tighten the screws evenly but do not over tighten. Connect wires as shown in the appropriate wiring diagram for your thermostat style.
- 4. To use a remote sensor on units with local sensing capability, remove jumper JP-1 to disable local sensing. Failure to remove JP-1 will cause improper operation of the thermostat.



- 5. Remove the LCD plastic protective film. Reinstall the cover assembly. Install the cover locking screw provided in the hole at the left side of the control enclosure to complete the installation.
- 6. Checkout: After wiring and installation are complete, energize the system and check the operation. Adjust the thermostat as necessary to complete at least one cycle. Be sure the thermostat and all other equipment are functioning correctly.

Thermostat Operation

These thermostats are designed to control On-Off, N.O. and N.C. valves, relays and three-wire floating valves. These units may include a fan switch with one or more fan speed selections.

Table 2: Main and Secondary Output Operation*

Output	3-Wire Floating	Off with Demand	On with Demand
Main 1 (Terminal 10)	Powers main valve open	On at temp demand	On at temp demand
Main 2 (Terminal 12)	Powers main valve closed	Cycles on with demand	Cycles on with demand
Secondary (Terminal 11)	Powers secondary valve open	Summer: Off with heat demand	Summer: On with heat demand
		Winter: Disabled	Winter: Disabled
Secondary 2 (Terminal 13)	Powers secondary valve closed	On at second stage heating demand	On at second stage heating demand

Note: * Operation determined by configuration. See Dip Switch Configuration Table.

Mode Button Operation

OFF: All thermostat outputs are off, fan is still operational if connected to manual fan speed switch.

AUTO: The thermostat automatically selects heating or cooling mode depending on the set point and room temperature. The appropriate HEAT or COOL indicator is enabled in addition to AUTO. A 3°F dead-band is provided to prevent short cycling between heating and cooling modes. After change-over the control points automatically shift so that the heating off-point or the cooling off-point equals the set point temperature.

COOL: The thermostat operates as a cooling-only thermostat. The heating outputs are disabled.

HEAT: The thermostat operates as a heating-only thermostat. The cooling outputs are disabled.

If constructed without a mode button, the thermostat operates in Auto mode, subject to configuration of the 2/4 pipe jumper and pipe sensor input.

Fan Speed Switch Operation

Fan speed is determined by manual selection from fan switch OFF to HIGH, MEDIUM and/ or LOW. In units with the Cycling Fan Option (demand output), the Fan operation (CYCLING vs. CONTINUOUS) is determined by application connections. In OFF position all outputs are off and display blank.

Up/ Down Arrow Operation

A first touch of either arrow will display the set point (a single set point is employed for both heating and cooling). Continued pressure on either arrow will scroll the set point to new values. After three seconds with no pressure on either arrow, the selected set point becomes effective and the display of the room temperature resumes.

Setback Operation

Connection of the Setback Input to 24 VAC 1 will force the control into unoccupied mode (see wiring diagram). Pressing an arrow key or the mode button on the thermostat cover will disable the setback input for one hour.

Pipe Sensor Operation

If cold water is detected, the system will operate in summer mode and the Main output will be cooling. If hot water is detected, the system will operate in winter mode, the Main output will be heating and First Stage Secondary Output will be disabled. In the case of an ambiguous reading, neither hot nor cold, the thermostat will initiate a purge cycle.

Three Wire Floating Valve Operation

Open and Close outputs are used to position the valve. Stroke time is factory set at two minutes. Outputs are off after reaching full on or off position. Valves are periodically reset for accuracy.

Outside Air Damper Operation

This output is ON any time the control is turned ON.

Application Notes

- 1. When no pipe sensor is used the main output controls cooling and the secondary output controls heating.
- 2. The pipe sensor should be mounted on the main coil input for water system operation and in the main duct system for forced air operation.
- 3. The set point and operating mode will be retained on a loss of power.
- 4. When using either a remote probe or pipe sensor, run wiring away from any electrical motors or power wiring.

Service Menu

Access: Press UP and DOWN arrows for 5 seconds.

Menu Selection: Select 1 to 5 by pressing the mode button or by pressing the UP and DOWN arrows simultaneously.

Adjust Value: Use UP or DOWN arrow.

Table 3: Service Menu Functions

Item #	Function	Range	Default
1	Zone Temp Offset	-5.1 F to 5.1 F	0F
2	Valve Stroke Time	30 sec. To 5 min.	120 sec.
3	Fan Delay to OFF	0 to 10 Minutes	0 Sec.
4	Compressor Mini- mum Off Time	30 Sec. To 10 min.	120 Sec.
		0 = Time Based	
5	Purge Cycle	1 = Temperature Based	1

Figure 3: Circuit Board Jumpers

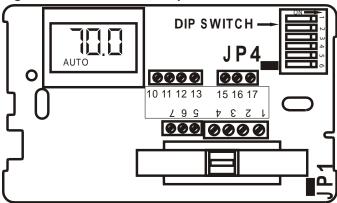


Table 4: Circuit Board Jumper Configuration

Jumper Designation	Jumper Installed ON	Jumper Removed OFF
JP1	Local Sensing	Remote Sensing
JP4	2 Pipe System*	4 Pipe System

Power-Up Operating Sequence

Upon application of power, an MTA158 will go directly to normal operation.

Installation Manual

IM 1017

Group: Applied Air Systems

Part Number: **910102992**

Date: August 2009

Installation

⚠ DANGER

MT 168 0-10 VDC/4-20mA Thermostat

READ THESE INSTRUCTIONS CAREFULLY BEFORE ATTEMPTING TO INSTALL, OPERATE OR SERVICE THIS THERMOSTAT.

Failure to observe safety information and comply with instructions could result in PERSONAL INJURY, DEATH AND/ OR PROPERTY DAMAGE.

To avoid electrical shock or damage to equipment, disconnect power before installing or servicing. Use only wiring with insulation rated for full thermostat operating voltage. Use copper wire only. Insulate or wirenut all unused leads. Any wiring, including the remote probe, may carry the full operating voltage of the thermostat.

To avoid potential fire and/ or explosion do not use in potentially flammable or explosive atmospheres.

Retain these instructions for future reference. You must review your application and national and local codes to ensure that your installation will be functional and safe.

⚠ CAUTION

Care should be used to avoid electrostatic discharge to the microprocessor.

This unit has configuration dip switches and jumpers. You may need to reconfigure the thermostat for your application.

- 1. Install the thermostat with the two furnished mounting screws to a standard 4-1/16" × 2-1/8" square device box with a 2" × 4" adapter ring.
- For wall installations, mount the thermostat on an inside wall approximately 5 feet above the floor. The location should provide circulation at average room temperature. Avoid direct sunlight or sources of hot or cold air in the room or wall.

Figure 1: Mounting

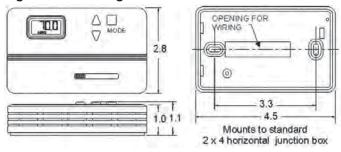
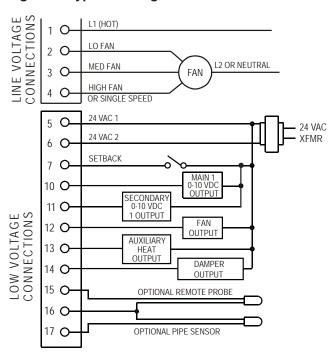


Figure 2: Typical Wiring*



NOTE: * Specific models may have fewer connections.

- Remove the cover. Mount thermostat base assembly to the outlet box using screws provided. Tighten the screws evenly but do not overtighten. Connect wires per wiring diagram.
- To use a remote sensor on units with local sensing capability, remove jumper JP-1 to disable local sensing. Failure to remove JP-1 will cause improper operation of thermostat.

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- Connecting a jumper between terminals 16 and 17 will disable the secondary output and change the main output to heat mode.
- 6. Connection of a 24 VAC set-back signal will force the control into unoccupied mode (see diagram). Pressing an arrow key or the mode buttons on the thermostat cover will disable the setback input for one hour.
- Remove the LCD plastic protective film to complete the installation. Reinstall the cover assembly. Install cover locking screw provided.
- 8. **Checkout:** After wiring and installation are complete, energize the system and check the operation. Adjust the thermostat as necessary to complete at least one cycle. Be sure the thermostat and all other equipment are functioning correctly.

Electrical Ratings

Table 1: Table 1: Fan switch (terminals 1-4) line voltage connections

Voltage Rating	Inductive		e Resistive Amps		Thermostatic Switching
Railing	FLA	LRA	Amps		
24 VAC	N.A.	N.A.	N.A.	24 VA	10 VA
120 VAC	5.8	34.8	6.0	125 VA	NA
240 VAC	2.9	17.4	5.0	125 VA	NA
277 VAC	2.4	14.4	4.2	125 VA	NA

Application Notes

- 1. When no changeover pipe sensor is used, the main output controls cooling and the secondary output controls heating.
- 2. The fan output, terminal 12, is energized whenever there is a demand for heating or cooling. This output can be connected to a relay that can be used to provide fan cycling to terminal 1.
- 3. The changeover pipe sensor should be mounted on the main coil input for water system operation and in the main duct system for forced air operation.
- 4. The set point and operating mode will be retained on a loss of power.
- 5. When using either a remote probe or pipe sensor, run wiring away from any electrical motors or power wiring.
- 6. The auxiliary heat output supplies a 24 VAC signal with call for heat. This output is shipped configured for staged heat.
- 7. The thermostat is shipped with all dip switches in the "ON" (closed) position.
- 8. The damper output is ON when mode is AUTO, HEAT or COOL. Damper is OFF in set back.

Thermostat Operation

These thermostats are designed to control 0-10 VDC/4-0 mA valves. These units may include a fan switch with one or more fan speed selections.

Mode Button Operation

OFF: All thermostat outputs are off, fan is still operational if connected to a manual fan switch.

AUTO: The thermostat automatically selects heating or cooling mode depending upon the relationship of the setpoint and the room temperature. The appropriate HEAT or COOL indicator is enabled in addition to AUTO. A 3°F dead band is provided to prevent short cycling between heating and cooling modes. After changeover, the control points automatically shift so that the heating off-point equals the set point temperature or the cooling off-point equals the set point temperature.

COOL: The thermostat operates as a cooling only thermostat. The heating outputs are disabled.

HEAT: The thermostat operates as a heating only thermostat. The cooling outputs are disabled.

Fan Speed Switch Operation

Fan speed is determined by manual selection from fan switch OFF to HIGH, MEDIUM and/or LOW. In the OFF position, all outputs are off and the display is blank.

Up/Down Arrow Operation

A first touch of either arrow will display the setpoint (a single set point is employed for both heating and cooling). Continued pressure on either arrow will scroll the setpoint to new values. After three consecutive seconds on either arrow, the selected setpoint becomes effective and the display of the room temperature resumes.

Configuration

Table 2: Circuit Board Jumper Configuration

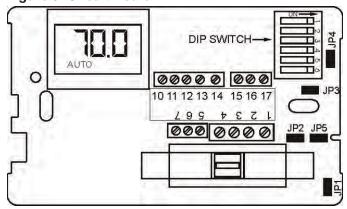
Jumper	Closed On*	Open Off
JP1	Local Sensing	Remote Sensing
JP2	2 Pipe System	4 Pipe System
JP3	Factory Use Only	_
JP4	0-10 VOC Main Output	4-20 mA Main Output
JP5	0-10 VOC Secondary Output	4-20 mA Secondary Output

Table 3: Dip Switch Configuration

Switch	Closed On	Open Off
1	Not Used	Not Used
2	Staged Heat 3°F Diff. (Term. 13)	Aux. Heat No Diff. (Term. 13)
3	F Display	C Display
4	Main & Sec. Outputs 0-10 VOC (Term. 10 & 11) requires JP4 & JP5	Main & Sec. Outputs 4-20 mA (Term. 10 & 11) Remove JP4 & JP5
5	Operating Position	Not Used
6	Setback= 90°F & 50°F	Setback = 85°F & 60°F

Note: * On is with the dip switch handle to the right. See diagram below.

Figure 3: Circuit Board



Service Menu:

Access: Press UP and DOWN arrows for 5 seconds.

Menu Selection: Select 1 to 5 by pressing the mode button or by pressing the UP and DOWN arrows simultaneously.

Adjust Value: Use UP or DOWN arrow.

Table 4: Service Functions

Item #	Function	Range	Default
1	Zone Temp Offset	-5.1 F to 5.1 F	0 F
2	Valve Stroke Time	30 sec. to 5 min.	120 sec.
3	Fan Delay to OFF	2 to 10 minutes	120 sec.
4	Compressor Minimum Off Time	30 seconds to 10 minutes	120 sec.
5	Purge Cycle	0 = time based 1 = temperature based	1



	Installation Manual	IM 846
		Group: Applied Air Systems
T170 Thermostat		Part Number: 910102993
		Date: July 2006

Installation

↑ WARNING

- BEFORE ATTEMPTING TO INSTALL, OPERATE, OR SERVICE THIS THERMOSTAT, CAREFULLY READ THESE INSTRUCTIONS.
- Failure to observe safety information and comply with instructions could result in PERSONAL INJURY, DEATH, AND/OR PROPERTY DAMAGE.
- To avoid potential fire and/or explosion, do not use in potentially flammable or explosive atmospheres.
- Retain these instructions for future reference. This
 product, when installed, is part of an engineered
 system whose specifications and performance
 characteristics are not designed or controlled by
 Daikin. You must review your application and
 national and local codes to assure that your
 installation is functional and safe..

↑ DANGER

Hazardous voltage. To avoid electrical shock or damage to equipment, disconnect power before installing or servicing.

Failure to follow these instructions will result in death or serious injury.

Thermostat Model and Part Number

Daikin offers two different thermostats depending on the fan speed control used (Table 2).

Table 1: Thermostat model and part numbers

Thermostat Model #	Daikin Part #	Fan Speed Control
TA170-001	107345335	3-Speed Fan Control
TB170-001	107345336	Staged Fan

NOTE: For a list of thermostat features, refer to ED 3611.

Optional Occupancy Detection Sensors/Kits

In addition to the T170 thermostat, Daikin offers optional occupancy detection sensors that can be ordered and used in conjunction with the thermostat. When ordering, use the associated kit number(s) provided in Table 2.

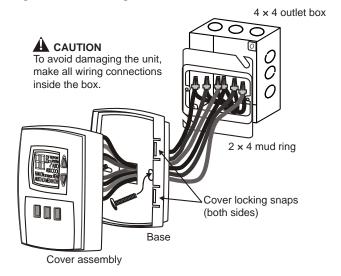
Table 2: Occupancy sensor model and kit numbers

Sensor Model #	Daikin Kit #
SA200-001	6677877211
SB200-001	6677877311
SD200-001	6677877411
SB200-002	6677877511

Mounting and Wiring the Thermostat

The thermostat base mounts to a field provided $4" \times 4"$ outlet box with a $2" \times 4"$ mud ring (Figure 1). The thermostat cover assembly mounts to the thermostat base.

Figure 1: Mounting the thermostat

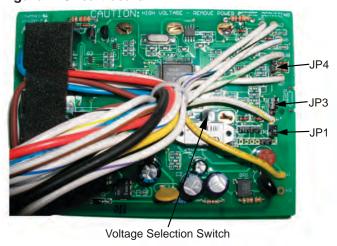


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- 1. Disconnect power before installing or servicing.
- 2. Run line voltage wiring (and low voltage wiring if applicable) into the field provided outlet box and mud ring (Figure 1).
- 3. Locate all connections within the mud ring/connection box and wire nut all unused wires.
- 4. Remove the thermostat cover assembly from its base to gain access to the circuit board (Figure 2).

Figure 2: Circuit board



- 5. On the circuit board, set the voltage selection switch (Figure 2) to the appropriate voltage for the application
 - 24 V = 24 VAC
 - 110–277 V = 120, 240, or 277 VAC.

NOTE: The circuit board is shipped with the voltage selection switch in the 110-227 V position. For 24 VAC use, the switch must be in the 24 V position.

⚠ CAUTION

Before applying power, the voltage selection switch must be in the appropriate position. Failure to select the correct voltage can cause thermostat malfunction or permanently damage the thermostat.

- 6. The circuit board is also equipped with configuration jumpers (JP1, JP3, and JP4 in Figure 2). Depending on the application, it may be necessary to reconfigure the following jumpers:
 - **JP4:** 2/4 Pipe Sensor Jumper This jumper selects between 2-pipe (jumper ON) and 4-pipe (jumper OFF) operation (see "Fan Operation").
 - JP3: Door/Window Switch Jumper This jumper is shipped normally open. Placement of a jumper allows for occupancy detection and door/ window switch only operation (see "Optional Occupancy Detection Equipment Operation").
 - JP1: Removal of this jumper allows the sensor to be located in a remote location.

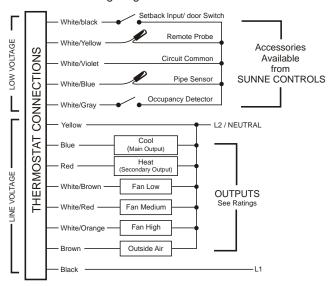
⚠ CAUTION

To use a remote sensor on units with local sensing capability, remove jumper JP1 to disable local sensing. Failure to remove JP1 can cause improper operation of the thermostat with a remote probe installed.

Connect the color coded thermostat wires (Figure
3) to the line voltage wires located in the mud ring/
connection box and secure the connections with wire
nuts.

Figure 3: Wiring diagram

Wiring diagram



⚠ CAUTION

Use copper wire only. Insulate or wire nut all unused leads.

Avoid electrostatic discharge to the thermostat.

Failure to do so can cause thermostat malfunction or permanently damage the thermostat.

8. Install the thermostat base to the mud ring/outlet box using two furnished mounting screws. Tighten the screws evenly but do not over tighten.

NOTE: An output ratings chart (Table 3) is located on the inside of the base.

Table 3: Output ratings

Output ratings					
Voltage	Inductive		Resistive	Pilot duty	HP
voltage	FLA	LRA	amps	Filot duty	111
24 VAC	NA	NA	NA	24 VA	NA
120 VAC	5.8	34.8	6.0	125 VA	1/4
240 VAC	2.9	17.4	5.0	125 VA	1/4
277 VAC	2.4	14.4	4.2	125 VA	1/4

⚠ DANGER

Hazardous voltage. Combined load current is not to exceed 20 amps. Mount only to a grounded metallic box.

Low voltage wiring is Class 2. To avoid electrical shock or damage to equipment, disconnect power before installing or servicing. Failure to follow these instructions will result in death or serious injury.

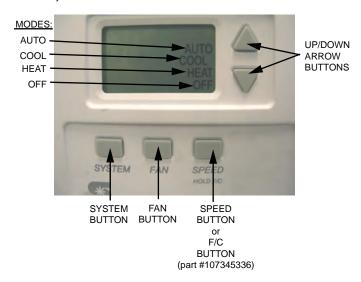
- 9. With the base now secured, verify that the circuit board is firmly snapped into the cover and is not dislodged.
- 10. Install the cover assembly to the base, pressing firmly to engage the cover locking snaps.

Operation

Thermostat Button Operation

The thermostat interface (Figure 4) contains buttons for use in navigating to accompanying menus/screens and for performing specific operations. These buttons and operations are described as follows.

Figure 4: Thermostat interface (model #TA170-001 shown)



System Button Operation

The System button (Figure 4) contains and displays the following modes of operation:

OFF—All thermostat outputs are off. The fan is still operational if FAN ON is selected.

AUTO—The thermostat automatically selects heating or cooling mode depending on the set point and room temperature. If demand exists, the appropriate HEAT or COOL icon illuminates. A 3°F dead band is provided to prevent short cycling between heating and cooling modes. After changeover, the control point automatically shifts so that the control OFF point equals the set point temperature.

COOL—The thermostat operates as a cooling only thermostat.

HEAT—The thermostat operates as a heating only thermostat.

UP/Down Arrow Button Operation

Use the Up and Down arrow buttons (Figure 4) to increase or decrease the temperature.

Fan Button Operation

Use the Fan button (Figure 4) to control operation of the fan. In the ON position, the fan output operates continuously. In the AUTO position, the output cycles with demand. In the OFF position, all outputs are off.

NOTE: Model #TB170-001 (part #107345336) has staged fan control.

Speed Button Operation (TA170-001)

The fan Speed button (Figure 4) for model #TA170-001 (part #107345335) is determined by manually selecting HI, MED, or LO. Press and hold the Speed button for five seconds to toggle the displayed temperature from Fahrenheit to Celsius.

F/C Button Operation (TB170-001)

Model #TB170-001 (part #107345336) is configured for staged fan control and therefore utilizes a F/C button (Figure 4) instead of a Speed button. When pressed, the F/C button toggles between Fahrenheit and Celsius.

Verifying Thermostat Operation

To verify thermostat operation after mounting and wiring it, perform the following:

- 1. Energize the system.
- 2. Set the fan to ON.
- 3. Select each fan speed, if available, to verify operation.
- Set the system button to AUTO or other available selection.
- 5. Using the UP arrow, adjust the temperature to more than 5°F above ambient temperature to cycle on heating.
- Using the DOWN arrow, adjust the temperature to more than 5°F below ambient temperature to cycle on cooling.

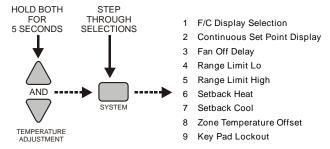
Thermostat Menu Functions

The thermostat menu contains nine functions which can be accessed using controls on the thermostat. Accessing the menu functions and details of each function are described below.

Menu Function Access

- 1. Press and hold the UP and DOWN arrow buttons (Figure 5) for five seconds.
- 2. The current display clears and the number "1" appears.
- 3. Press the SYSTEM button to scroll to the next item number.
- 4. Use the UP and DOWN buttons to make changes within the selected number.

Figure 5: Thermostat menu



Menu Functions

1. F/C (Fahrenheit/Celsius) display selection

When this function is selected, the F and C icons appear and the selected icon flashes. To toggle between F or C, press the up or down arrow button.

2. Continuous set point display

When this function is selected, the F or C icon, current digits, and the set point icon appear. If the Continuous set point display is enabled, the set point icon flashes. To toggle between continuous display of set point and display of zone temperature, press the up or down arrow button.

3. FAN off delay

When this function is selected, the FAN, OFF, and digits appear. The digits represent the number of seconds the fan stays on after the heating and cooling outputs are turned off. To increase or decrease the value from 0–255 seconds, press the up or down arrow button.

4. Range limit low

When this function is selected, the current minimum range setting, the SET POINT icon. and the LO icon appear. To increase or decrease the value, press the up or down arrow button.

5. Range limit high

When this function is selected, the current maximum temperature range adjustment, SET POINT icon, and LO icon appear. To increase or decrease the value, press the up or down arrow button.

6. Set back heat

When this function is selected, the current temperature range adjustment, the SET BACK icon, and the HEAT icon appear. To increase or decrease the value, press the up or down arrow button.

7. Set back cool

When this function is selected, the current Cool setback value, the SET BACK icon, and the COOL icon appear. To increase or decrease the value, press the up or down arrow button.

8. Zone temperature offset

When this function is selected, the numeric ones and tenths (0.0) appear with a leading minus sign. To increase or decrease the value \pm 0°F, press the up or down arrow button. Increments are made in 1°F and 0.5°C.

9. Keypad lockout

When this function is selected, the ON and OFF icons appear. The enabled icon flashes. OFF is the default. ON disables the keypad except for entry into the service menu. To increase or decrease the value, press the up or down arrow button.

NOTE: In the event of a power failure, these values are stored and can be recalled.

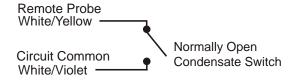
Condensate Overflow Interrupt

The remote probe input can be used with a condensate overflow switch (CO), either in conjunction with a remote probe (normally closed CO switch, Figure 6), or with local sensing (normally open CO switch, Figure 7). When the condensate switch activates, the thermostat displays a service wrench icon and disables all outputs.

Figure 6: Remote probe installation



Figure 7: Local sensor installation



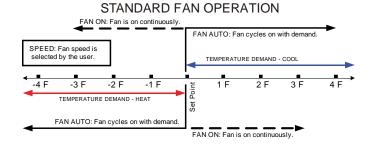
Fan Operation

The thermostat may be factory configured for standard or staged fan operation.

Standard Fan Configuration (TA170-001)

Units with standard fan operation (Figure 8) have a selectable fan Speed button.

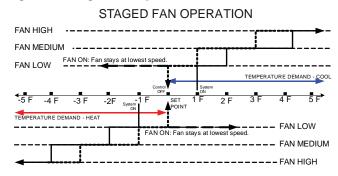
Figure 8: Standard fan operation



Staged Fan Configuration (TB170-001)

Factory configuration is available for staged fan operation (Figure 9) to provide occupant comfort while using the most effective fan speed.

Figure 9: Staged fan operation



Controlled Off Factory Configuration

A factory configuration may be provided for minimum heating and cooling requirements. Using this configuration, the HEAT and COOL outputs are automatically cycled on at the heat setback limit. Your thermostat may not have this feature.

Fancoil Operation

Fancoil operation is either a 2-pipe or 4-pipe configuration which is determined by jumper selection JP4 (see "Mounting and Wiring the Thermostat").

2-Pipe Operation

In this configuration, the thermostat permanently disables the secondary output and disables the fan from cycling in an invalid mode. The main output configuration is dependent on the pipe sensor input. With a pipe sensor connected, the thermostat automatically selects heating or cooling depending on the sensed water temperature. If the pipe sensor input is open (unconnected), the main output only cools. If the pipe sensor input is shorted, the main output only heats. Normal thermostat default is for 4-pipe operation. For 2-pipe operation, install a jumper on JP4.

4-Pipe Operation

In this configuration, both the main output (COOL) and the secondary output (HEAT) are available. These both cycle ON depending on the mode of the thermostat. With a pipe sensor connected, the thermostat automatically changes the main output to heat and disables the secondary output if the main coil water is hot. For 4-pipe operation, the JP4 jumper is removed.

Pipe Sensor Operation

A pipe sensor can be connected when the thermostat is configured for either 2-pipe or 4-pipe configuration. The pipe sensor is used to determine the water temperature in the main coil, which should be connected to the primary output.

Pipe sensor input—use a 10K Remote Probe or a standard ON-Off Aquastat for summer/winter changeover.

Purge Cycle

With a pipe sensor connected, the thermostat initiates a purge cycle if the sensed water temperature is ambiguous (not adequately hot or cold). The sequence for purge cycle operation is as follows:

1. The thermostat has a call for heat or cooling.

NOTE: If at any time the call goes away, the thermostat stops the purge cycle.

- 2. The thermostat checks the pipe sensor to verify water temperature.
- 3. If the water temperature is beyond 15°F of the set point, normal HVAC control occurs.

4. If the water temperature is not beyond 15°F of the set point, the thermostat checks to see if the water temperature is above 80°F or below 60°F.

If yes, normal HVAC control occurs.

If no, the thermostat opens the main output (COOL) for three minutes.

5. After the three minute purge cycle occurs, the thermostat checks to see if the water temperature is more than 15°F from the set point, or above 80°F, or below 60°F.

If yes, normal HVAC operation occurs.

If no, the valve is left open and the thermostat continues to search for a valid reading.

NOTE: If at any time the demand goes away, the thermostat will stop the purge cycle.

Table 4 shows output operation, depending on the sensed water temperature.

Table 4: Output operation

2-Pipe/4-Pipe	Water	Output operation		
selection	temperature	Main output	Secondary output	
2-pipe	Cold	Cooling only The fan does not cycle on with a heat demand.	Disabled	
JP4 ON	Hot	Heating only The fan does not cycle on with a cool demand.	Disabled	
	Cold	Cooling	Heating	
4-pipe JP4 OFF	Hot	Heating only The fan does not cycle on with a cool demand.	Disabled	

Setback Operation

In this configuration, the low level switch input normally is open. To enable setback operation, the JP3 jumper is removed (see "Mounting and Wiring the Thermostat"). The input will close and the thermostat heating and cooling setback limits can then be used as temperature control points. Fan operation in setback is cycled with demand. Press any thermostat key to override setback for one hour. Setback overrides any user setting except if the control is turned to OFF.

Optional Occupancy Detection Equipment Operation

The T170 thermostat can be used with optional S200 series occupancy detection equipment. Purchasing and installing this equipment to compliment the thermostat adds energy savings by setting back HVAC operation during occupied and unoccupied times. Optional detection equipment configurations and operation are described below.

SB200-001 Occupancy Sensor

The SB200-001 occupancy sensor (Figure 10) serves as an occupancy sensor for automatic control of a guest room HVAC system. It incorporates an innovative dual delay processor which allows the sensor to verify the nature of occupancies, and is capable of eliminating unnecessary actuations of the HVAC device due to unintentional passages or short time occupancies. The sensor may also serve as a slave sensor (Figure 11).

The sensor switch is open in occupied mode and closed in unoccupied mode. An optional door and/or window switch (Figure 10) is open when the door/window is open and is closed when the door/window is closed.

NOTE: To use this configuration, a jumper must be installed to JP3 to allow occupancy input.

NOTE: An optional door and/or window switch (Figure 10) can be added for use with the SB200-001 sensor.

Operation

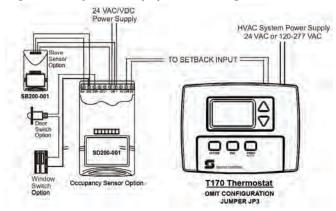
In an occupied mode, the thermostat operates normally and looks for a door open signal. When the door opens, the thermostat waits for a door close signal. If the door is open for more than two minutes, the thermostat turns the HVAC system outputs to OFF. During this two minute period, if any button is pressed on the keypad, the time delay is extended to ten minutes. The time delay can only be extended once. Once the HVAC outputs transition to OFF, a door closure is required to re-enable the outputs. When the door closes, the thermostat starts a two minute timer and tries to detect occupancy. If the timer expires and no occupancy is detected, the thermostat transitions to an unoccupied state. If occupancy is detected while the timer is running, the thermostat will remain in the occupied mode.

In an unoccupied mode, the thermostat sets heating and cooling set points to setback values as determined by factory or user settings. The fan is automatically set to cycle with demand. The thermostat continually monitors the occupancy sensor and will enter into occupied mode if occupancy is detected.

If the installation is only using a door/window switch, the thermostat will disable the HVAC outputs if this output is open for longer than two minutes.

To enable door/window switch only operation, install a jumper to JP3 (see "Mounting and Wiring the Thermostat") and the occupancy input must be shorted to circuit common.

Figure 10: Optional equipment configuration #1



SD200-001 Occupancy Sensor

The SD200-001 occupancy sensor (Figure 11) serves as a master sensor for a guest room HVAC management system. The sensor provides HVAC operation according to occupancy status, as well as door/window switch monitoring, selectable high/low temperature setback, form-C output, slave sensor connectivity, and a five minute door open HVAC shut-off.

NOTE: To use this configuration, the jumper to JP3 is removed to allow setback input.

NOTE: An optional door and/or window switch (Figure 11) and slave sensor can be added for use with the

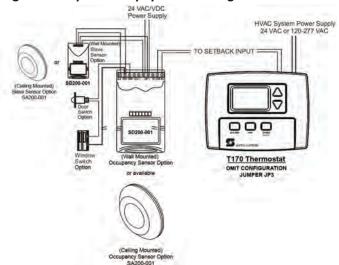
SD200-001 sensor.

Operation

In an occupied mode, the SD200-001 occupancy sensor (Figure 11) and door switch use advanced microprocessor logic to determine occupancy. A door open signal will initiate occupancy status detection. If the sensor determines that a room is occupied, it will allow normal HVAC control. The sensor will wait for another door open signal before determining occupancy again.

In an unoccupied mode, the sensor continually monitors the room. Any occupancy detection will set the operation to occupied mode.

Figure 11: Optional equipment configuration #2



SD200-002 Occupancy Sensor

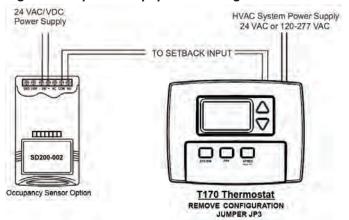
The SD200-002 occupancy sensor serves as a stand alone master sensor for a guest room HVAC management system. The sensor provides HVAC operation according to occupancy status, as well as selectable high/low temperature setback, form-C output, and a five minute door open HVAC shut-off. This system provides basic room setback and is ideal for control of HVAC in commercial spaces.

NOTE: To use this configuration, the jumper to JP3 is removed to allow setback input.

Operation

With each occupancy detection, an OFF delay is started and can be set to delay for up to 30 minutes.

Figure 12: Optional equipment configuration #3





Installation Manual Group: Applied Air Systems Part Number: 667757200 Date: May 2006

Safety Information

Thermostat Conversion Kit

WARNING

The installation of this equipment shall be in accordance with the regulations of authorities having jurisdiction and all applicable codes. It is the responsibility of the installer to determine and follow the applicable codes. This equipment is to be installed only by an experienced installation company which employs trained personnel.

⚠ WARNING

Rigorously adhere to field wiring procedures regarding proper lockout and tagout of components.

↑ WARNING

To avoid electrical shock, personal injury or death:

- 1. Installer must be qualified, experienced technician.
- Disconnect power supply before installation to prevent electrical shock and damage to equipment.

⚠ CAUTION

If the FAN Switch remains in the left-most (Off) position the thermostat will NOT function properly.

Introduction

This thermostat conversion kit number 107345245 converts a fan coil unit thermostat to a thermostat without a 3-speed switch. The thermostat kit includes a cover that does NOT have an opening for the 3-speed control switch. The following is the proper procedure to convert the thermostat.

Procedure

- 1. Carry out this procedure before mounting the thermostat or applying power to it. If the thermostat is already mounted, turn off all power to it before proceeding.
- 2. Slide the FAN switch on the front of the thermostat to the setting at which you want the motor to run all the time.

NOTE: Once you exchange thermostat covers, the user can no longer change this setting.

- 3. Remove the cover from the thermostat by gently prying behind the left hand edge of the cover with a small screwdriver, then pulling it off as shown in Figure 1 and Figure 2.
- 4. Adjust the dip switch and jumpers to your desired configuration (see thermostat installation manual).
- 5. Pull off the fan slide switch cap (Figure 3).

NOTE: Be careful not to change the position of the switch you set in Step 2.

6. Place the new thermostat cover that does not have the 3-speed switch opening on the thermostat (Figure 4).

Figure 1: Pry behind left hand edge of cover to remove

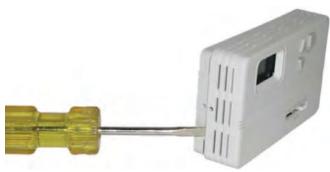




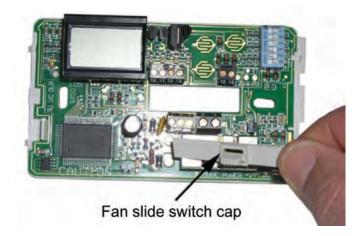
Figure 2: Pull left end of cover away until tabs at right end are cleared



Figure 4: Thermostat cover without 3-speed switch opening



Figure 3: Remove plastic fan slide switch cap





Daikin Training and Development

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Aftermarket Services

To find your local parts office, visit www.DaikinApplied.com or call 800-37PARTS (800-377-2787). To find your local service office, visit www.DaikinApplied.com or call 800-432-1342.

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